# Measuring inflation using Laspeyres Index – Teacher notes

## Activity description

This activity involves using a formula to calculate Laspeyres index in order to obtain a measure of price changes between different periods of time. Students can use either a spreadsheet and/or a calculator to do the working.

### Suitability

Level 3 (Advanced)

### Time

1–2 hours, depending whether students go on to calculate their personal fixed base Laspeyres index.

### Resources

Student information sheet, worksheet
Optional: spreadsheet

### Equipment

Calculators and/or computers with Excel

### Key mathematical language

Index, base period, fixed base

## Notes on the activity

The slideshow introduces the aim of the session – to calculate a price index.

The information section on the student sheets gives the formula for the fixed base Lespeyres index.

You could complete the coffee shop example as a whole class activity and discuss the 'Think about' questions before students work through the other examples. Students could then calculate their own personal inflation rate, using goods and services they buy.

## During the activity

Students could be encouraged to work in pairs, not just to calculate the required values of the index but also to interpret and understand the practical meaning of their calculations and results.

## Points for discussion

Check that students understand the reason for the use of 100 as a base, and the link between the Laspeyres index and the percentage rate of inflation.

Make sure students realise that the fixed base Laspeyres index assumes that the *quantities bought remain the same* after the price change. Discuss this assumption with them, and reasons why this may not be the case.

Ask whether students think the Laspeyres index gives an over-estimate or an under-estimate of the rate of inflation.

Ask students if they can think of any way of improving the index. At this point you may decide to outline the approach used in the Paasche index and the Fischer index.

Ask which goods and services students would include when calculating a personal fixed base Laspeyres index. Are their suggestions enough? Are there too many items? What other factors need to be taken into consideration?

## Extensions

The National Statistics website offers a personal inflation calculator.

To read about and use this calculator visit www.nationalstatistics.gov.uk

## Answers

The summation $\sum P_{i0}Q_{i0}$ calculates the total price of all the commodities in the 'base period', *0*.

The summation $\sum P_{it}Q_{i0}$ calculates the total price of the *same quantities of the commodities* at time, *t*.

### Task 1 Coffee shop

**a** Last week

| Drink | Price | Quantity bought | Cost |
|---|---|---|---|
| White Coffee | £1.20 | 7 | £8.40 |
| Black Coffee | £1.10 | 3 | £3.30 |
| Tea | £0.90 | 5 | £4.50 |
| | | Total Cost | £16.20 |

**b** Next week

| Drink | Price | Quantity bought | Cost |
|---|---|---|---|
| White Coffee | £1.35 | 7 | £9.45 |
| Black Coffee | £1.20 | 3 | £3.60 |
| Tea | £0.95 | 5 | £4.75 |
| | | Total Cost | £17.80 |

**c** Total cost next week as a percentage of the total cost last week = 109.9

The Laspeyres price index ignores any change in the quantities bought. It will tend to exaggerate the effect of a price increase. This is because consumers will usually buy less when the price rises or buy other products that have lower price increases instead.

### Task 2  Farmers' market

**a**  101.2    **b**  99.6

An index of 103.5 suggests that the percentage rate of price increase from week 0 to week 3 is 3.5%.  This is because the base period index number is always 100.

Prices rose by 1.2% between Week 0 and Week 1.

Prices fell by 0.4% between Week 0 and Week 2.

The shopper may buy different items and amounts from the farmers' market after 6 months, for a variety of reasons: availability of vegetables, price of vegetables, or seasonal variations such as temperature. All these might make the vegetables more or less desirable.

### Task 3  DVD sales

**a**  116.3    **b**  83.7

The first answer suggests that prices rose by 16.3% between Month 0 and Month 1, whereas the second suggests prices fell by 16.3% between Month 0 and Month 2.

Students may suggest reasons for these results. For example, if Months 0, 1 and 2 are November, December and January, price changes may be due to Christmas shopping and January sales.

 It may also be noted that the number of sales in Month 2 is nearer to the number of sales in Month 0 than the number of sales in Month 1.

The similarity in quantities bought suggests that answer **b** may be more reliable than answer **a**.