# 29. Ratio, Proportion and Rates of Change

**Calculating the impact of inflation and interest rates on savings.**

**After reading about inflation in the news, Ade is researching where best to deposit his savings. As part of his research, Ade learns the following:**

- **Inflation** is the rate of price increases over a period of time.
- **Nominal value** refers to an item's face value. For example, a £50 note has a nominal value of £50).
- **Real value** refers to an item's nominal value after it has been adjusted for inflation. For example, if inflation is 5% a year, then next year £100 will only buy roughly £95 worth of things in today's prices.
- Banks pay **interest** to savers, which increases the value of their savings and protects those savings against inflation.

**Ade applies these learnings to try to shield his savings from the effect of inflation.**

**NB:** The formula for calculating real value is: Real value = Nominal value x 1/(1 + inflation rate) ^ (number of years). For example, if inflation is 5% per year and you have £100 today, then the real value of £100 after **two** years would be: £100 x $(1/1.05)^2$ = £90.70.

1. If inflation is 3% per year and Ade has £600 in a bank account that does not pay interest, how much are Ade's savings worth in real terms after the following periods of time?

   a. 1 year.

£600 x 1 ÷ 1.03 = £582.52

b. 3 years.

£600 x 1 ÷ $1.03^3$ = £549.08

c. 5 years.

£600 x 1 ÷ $1.03^5$ = £517.57

2. Ade has a further £2,000 in another bank account that does not pay interest. If inflation is expected to be 6% in Year 1, 5% in Year 2 and 3% in Year 3, how much will Ade's savings be worth in real terms after three years?

£2,000 x 1 ÷ 1.06 = £1,886.79

£1,886.79 x 1 ÷ 1.05 = £1,796.94

£1,796.94 x 1 ÷ 1.03 = **£1,744.60**

3. Ade discovers a savings account that offers guaranteed 2.5% annual interest for the next three years. If Ade deposited £1,500 in the account, how much interest would he earn over this period?

£1,500 x $1.025^3$ = £1,615.34 = £115.34 of interest

4. Ade is considering opening an account that offers 2% interest per year.

   a. If Ade deposits £2,000 into the account, what is the nominal value of Ade's savings after one year?

Nominal Value = £2,000 x 1.02 = £2,040

b. If inflation is 4% during Year 1 of having the account, what is the real value of Ade's savings after one year?

£1,500 x $1.025^3$ = £1,615.34 = £115.34 in interest

c. Ade expects to deposit a further £1,000 of savings in the account at the beginning of Year 2 of having the account. Assuming that both inflation and interest in Year 2 of having the account are 3% and using your answers to Question 4a and 4b above, what would the real and nominal values of Ade's total savings in the account be at the end of Year 2?

Nominal Value after the second year:

Nominal Value = (£2,040 + £1,000) + [ (£2,040 + £1,000) x 0.03 ] = £3,131.20

Real value = £3,040 (the inflation rate and interest rate are the same so they cancel out)

5. After reading that inflation has increased to 5%, Ade looks for a bank account with a higher interest rate. He finds a new account offering 4% interest per year and transfers £3,000 to the new account. Calculate the nominal and real values of his savings in the account after 12 months.

Nominal Value = £3,000 + (£3,000 x 0.04) = £3,120

Real Value = £3,120 / (1 + 0.05) = £2,971.43

6. Ade is discussing the impact of inflation on savings with a friend. His friend asks "does high inflation mean there is no point in saving money right now?". Considering what you now know about inflation and the real value of money, how do you think Ade should respond to this question?

- Putting savings in a non-interest-bearing account will mean that the real value of your savings decreases due to inflation.
- Putting your money in an interest-bearing account will earn you interest, which will grow your savings and therefore reduce the impact of inflation.
- The higher the interest rate you are able to get on your savings, the better protected those savings will be against inflation.