11. Ratio, Proportion and Rates of Change

Analysing investment opportunities

In pairs or small groups, review the potential investment opportunities on page 4. Each investment opportunity comes with both risk and reward as demonstrated by its performance over the last five years. You will need to calculate compound returns and percentage changes to answer a series of questions about each potential investment.

As a pair or group, discuss your views on the concept of risk and reward and consider how your feelings towards risk may change over time. Present your views to the class and discuss what factors can impact people's appetite for risk over their lifetimes.

1. What are the main pros and cons of each opportunity set out on page 4, in your opinion? Consider factors such as the return on your savings, how easily you could access your savings, and how much risk you would be taking on.

Example pros and cons may include the below but open discussion is encouraged.

Stock market:
- Pros: higher potential returns
- Cons: higher risk of losing money, uncertainty of what to invest in, can seem complex

Bonds:
- Pros: lower risk than stocks, returns are known and fixed for the period
- Cons: lower returns than stocks, can seem complex

Savings accounts:
- Pros: deposit not invested so no risk of losing money
- Cons: low returns and interest rates are not guaranteed

2. [Higher] For each opportunity calculate the value of your investment if you had invested £3,000 in the account five years ago. Be sure to read the description of each opportunity as this information includes additional points you should factor into your calculations.

   a. Calculate the percentage change in your savings over those five years.

Stocks: £3,000 x 1.05 x 1.1 x 0.85 x 1.03 x 1.12 = £3,397.64
(£3,397.64-£3,000)/£3,000 = 13.25%
Bonds: £3,000 x 1.01 x 0.98 x 1.02 x 1.01 x 1.02 = £3,120.26
+ interest (£3,000 x 0.25% x 5) = £37.50
(3,157.76-£3,000)/£3,000 = 5.26%
Savings account: £3,000 x 1.01 x 1.01 x 1.005 x 1.005 x 1.0025 = £3,098.71
(£3,098.71-£3,000)/£3,000 = 3.29%

   b. What was the average annual growth rate of each opportunity (ignore the interest on bonds)?

Stocks: (5% + 10% - 15% + 3% + 12%) / 5 = 3%
Bonds: (1% - 2% + 2% + 1% + 2%) / 5 = 0.8%
Savings account: (1% + 1% + 0.5% + 0.5% + 0.25%) / 5 = 0.65%

   c. Which opportunities offered the highest and lowest returns?

The stock market returned the highest average annual growth rate, however, it did also fluctuate the most. Bonds returned the second highest rate and the savings account had the lowest returns.

d. [Higher] If after three years you sold or withdrew half of your investment and left the remainder in that account, how much would you have today (ignore bond interest)? Comment on how withdrawing funds from your savings pot affected your returns.

Stocks: £3,000 x 1.05 x 1.1 x 0.85 = £2,945.25 (value after 3 years)
£1,472.63 x 1.03 x 1.12 = £1,698.82
Bonds: £3,000 x 1.01 x 0.98 x 1.02 = £3,028.79 (value after 3 years)
£1,514.39 x 1.01 x 1.02 = £1,560.13
Savings account: £3,000 x 1.01 x 1.01 x 1.005 = £3,075.60 (value after 3 years)
£1,537.80 x 1.005 x 1.0025 = £1,549.35

Removing funds from these accounts earlier reduced the total return as less money is now invested and earning a return.

3. In the real world, we never really know how an investment is going to perform, whether the stock market will go up or down, or how the country's economy will do. Given this uncertainty, discuss your views on where you would put your savings.

   a. Would you rather your savings were as safe as possible and accept a smaller return or would you take on more risk for the chance of a larger return?

Answers will depend on pupil's personal preferences. Any sensible answers accepted.

   b. Do you think that your approach would change over the course of your life? What factors might impact your risk appetite?

Any sensible answers accepted. For example:

- **Age:** Younger people may take more financial risk as they have fewer financial obligations such as mortgages and lots of time to make back any money lost.
- **Earnings:** Those with higher earnings may be inclined to take more financial risks.

Investment opportunities

Investing always involves the risk of losing some or all of your money. Riskier investments should, in theory, offer better potential returns than a less risky one (or else there would be no point in taking on the higher risk). However, investors must not forget that riskier investments also have a greater chance of losing money.

Stock Market Fund	Investing in the stock market is risky but the returns are typically higher than investing in bonds or depositing cash in a savings account.
Bonds	Bonds are typically a less risky investment than stocks, and returns tend to be low and stable. In addition to going up or down in price, bonds also pay out interest. For this activity, assume that the bonds pay out 0.25% **simple** interest per year in addition to their annual returns.
Variable savings account	A savings account typically offers a slightly higher interest rate than a current account. To entice savers, banks often offer an introductory rate (e.g. a higher rate for a fixed period of time). Assume for this activity that the savings account offers a 1% introductory **compound** rate for the first two years after you open the account.

	Stock Market Fund	Bonds	Variable savings account
2021 return	12%	2%	0.25%
2020 return	3%	1%	0.5%
2019 return	-15%	2%	0.5%
2018 return	10%	-2%	1%
2017 return	5%	1%	1%