Andrew Hingston

Financial independence 1

You need to be able to ...

1. Clearly explain the concept of financial independence
2. Estimate the amount that you will need each year to cover your living expenses when you are financially independent
3. Calculate the amount of investments that you will need to fund your financial independence
4. Calculate the future value of any existing investments
5. Calculate the amount that you need to save each year to achieve financial independence
6. Explain the key principles and strategies to achieve financial independence

What is financial independence?

Think and discuss

What do you think
most of your friends believe
it means to be
‘financially independent’?

How do they think
they can achieve it?

What is it?

When your investment income is enough to cover all of your monthly living expenses

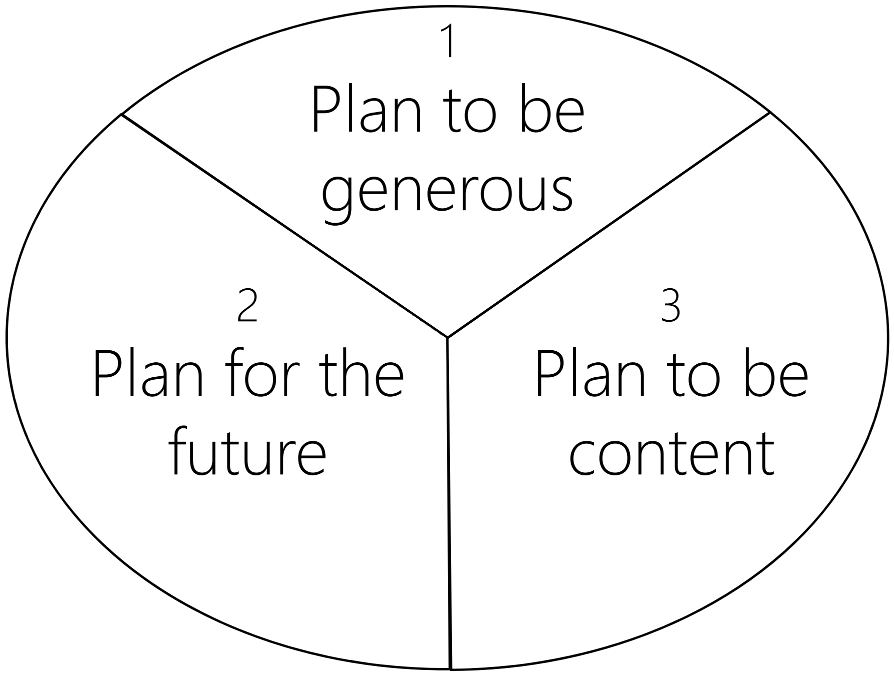
- **You don't need to work anymore**
- **Any personal income is just a 'bonus'**

'Rich' ≠ Financial Independent

- **'Rich' could mean high income from work**
  - But … are they spending all that they earn?
  - What happens if they lose their job?
- **'Rich' could mean lots of assets or a nice house**
  - But … how much money have they borrowed?
  - Your home does not generate cash to put food on table!

Financial independence and the pie

Your pie is your
total income
each month



Investment income covers all three
Personal income is <u>not</u> required

Financial independence and your snowball

Amount saved = Income – Expenses

How to get it?

1. **Consistently ‘save to invest’ 10% of your income**

   … and never spend the ‘capital’ of your investments

2. **Avoid dumb investment decisions**

3. **Diversify across multiple strategies**

Why it is good to be patient

1. **What personal sacrifices would I have had to make?**
2. **100% leisure time gets boring pretty quickly**
3. **People seem to lose self-respect and significance when they are not busy doing things.**
4. **Other people don’t respect others who are not busy doing things.**

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Modelling financial independence

Recap: Imagine that you are aged 60 …

Where would you like to be living?

Country, city or town, suburb …

Who would you like to be living there?

Only you? Partner? Children? …

What would you like to do in a typical day?

Eating, entertainment, sport, hobbies, interests …

What is a typical holiday?

What car do you drive?

How much income would you need to support this lifestyle today assuming you own your home (with no debt)?

The key steps

1. **Set a target age for financial independence**
2. **Imagine your lifestyle in detail**
3. **Calculate the cost of this lifestyle per year <u>not</u> including mortgage and rent payments (R_1)**
4. **Estimate the average return that your investments can achieve in the long-run less inflation (r)**
5. **Estimate the growth rate in your living expenses compared to inflation (g)**

Some key assumptions

1. **No rent or mortgage payments**

   Since you should have paid off your mortgage!

2. **Nominal investment returns of about 9%**

   Inflation + Real economic growth + Average rent or dividend yield

   2% to 3% + 2% to 3% + 3% to 5%

3. **Real investment returns of about 6.5%**

   Nominal returns (9%) less expected inflation (2.5%) = 6.5%

4. **No inflation in the cost of living**

   We are going to use real investment returns (6.5%)

   … but our investments will actually receive nominal returns (9.0%)

   … so this hopefully corrects for inflation in our cost of living estimates

Recap: Growing perpetuity formula ($A_{\infty,g}$)

A is the 'real value' that your financial investments must accumulate to by age 60 (ignoring inflation).

R_1 is the 'real value' of your estimated living expenses at age 60 for one year (ignoring inflation).

'g' is the rate of increase (or decay if it is negative) of our living expenses after age 60 above the rate of inflation.

'r' is the 'real' rate of return that you expect your investments to achieve after the age of 60 over and above inflation.

$$A_{\infty,g} = \frac{R_1}{(r - g)}$$

Recap: Example 1

How much would Susan need for financial independence if she would like $80,000 per year (ignoring inflation), growing at the rate of inflation (which she expects to be 2.5% per year) if she can achieve nominal investment returns of 9.0% per year (real returns of 6.5%)?

$$
\begin{aligned}
\mathbf{A}_{\infty,g} &= \frac{\mathbf{R}_1}{(\mathbf{r}-\mathbf{g})} \\
&= \frac{80{,}000}{0.065-0} \\
&= 1{,}230{,}769
\end{aligned}
$$

Recap: Example 2

How much would David need for financial independence if he would like $80,000 per year (ignoring inflation), growing at the rate of 2% above inflation (which he expects to be 2.5% per year) if he can achieve nominal investment returns of 9.0% per year (6.5% per year)?

$$\begin{aligned} A_{\infty,g} &= \frac{R_1}{(r-g)} \\ &= \frac{80{,}000}{0.065 - 0.02} \\ &= 1{,}777{,}778 \end{aligned}$$

Recap Q: Calculate age 60 financial goals

a) John would like $100,000 per year in income when he is financially independent at age 60 and for that amount to keep pace with inflation. He expects inflation to be 2.5% per year and his investments to achieve nominal returns of 9.0% per year and real returns of 6.5% per year. How much does he need for financial independence?

b) Sarah would like to receive the same amount as John above but is happy for the 'real value' of her income to decline by 2% per year (that is, increase at a rate of 2% below inflation). How much does she need for financial independence?

c) Based on your planned future lifestyle, how much do you need for financial independence assuming 2.5% inflation and 6.5% real returns on your investments?

Go to Answer

Recap: Planning to save

Compound interest = future value

Remember simple and compound interest from school?

Simple interest

Interest is calculated on principal amount saved only

Compound interest

Interest is calculated based on both principal and past interest

In this course we will always use compound interest

Future value of a single amount

The equivalent future value (F)

at some stage in the future (n periods)

of a single amount invested now (P)

at a rate of return of ‘r’ per period.

$$\mathbf{F} = \mathbf{P} \times (\mathbf{1} + \mathbf{r})^{\mathbf{n}}$$

Example of future value of single amount

How much money will Susan have in her savings account in 5 years if she deposits $1,000 now at an interest rate of 6% pa?

0	1	2	3	4	5
1,000					**F**

$$\mathbf{F} = \mathbf{P} \times (\mathbf{1} + \mathbf{r})^{\mathbf{n}}$$

$$= \mathbf{1{,}000} \times \mathbf{1.06}^{\mathbf{5}}$$

$$= \mathbf{1{,}338.23}$$

$1000 \times 1.06\ x^{\blacksquare}\ 5 \blacktriangleright =$

= FV (0.06, 5, 0, 1000)

What is an annuity?

Regular series of cash flows

Cash flows are all the same

First cash flow is saved in one period

- **If first saving amount is today then it should be handled separately**

There is a final cash flow

No missing amounts in the middle

0	1	2	3	4	5
	$1,000	$1,000	$1,000	$1,000	$1,000

Future value of an annuity (S)

The future value (S)

of a set of regular identical cash flows (R)

paid for n periods

with a return of r per period

$$S = R \times \left(\frac{(1+r)^n - 1}{r} \right)$$

Example of future value of an annuity

How much will Susan have in her account in 5 years if she puts in $1,000 at the end of year for the next 5 years at an interest rate of 6%pa?

0	1	2	3	4	5
	1,000	1,000	1,000	1,000	1,000
					S

$$\mathbf{S} = \mathbf{R} \times \left(\frac{\mathbf{(1+r)^n - 1}}{\mathbf{r}} \right)$$

$$= \mathbf{1{,}000} \times \left(\frac{\mathbf{1.06^5 - 1}}{\mathbf{0.06}} \right)$$

$$= \mathbf{5{,}637.09}$$

1000 × ((1.06 $x^{■}$ 5 ▶ − 1) ÷ .06) =

= FV (0.06, 5, 1000, 0)

Future value annuity with unknown payment (R)

How much will Susan need save at the end of each year to have $5,000 in the account after 5 years at an interest rate of 6%pa?

0	1	2	3	4	5
	R	R	R	R	R
					5,000

$$\mathbf{R = S \div \left(\frac{(1+r)^{n} - 1}{r} \right)}$$

$$\mathbf{R = 5{,}000 \div \left(\frac{1.06^{5} - 1}{0.06} \right)}$$

$$\mathbf{= 886.98}$$

5000 ÷ ((1.06 $x^{■}$ 5 ▶ − 1) ÷ .06) =

= PMT (0.06, 5, 0, 5000)

Q: Planning to save

a) You already have $10,000 in your savings account. How much will you need to set aside for a $3,000 holiday in 2 years if the interest rate is 6% per year compounded monthly (0.5% per month)?

b) A 20 year old starts saving $100 every month and invests it at a return of 12% per year (1% per month). How much will she have at age 60 (after 480 months)?

c) A 20 year old has decided that they need $1 million to be financial independent at age 60 (40 years). They can invest at return of 12% per year. How much do they need to save each year to achieve this goal?

Go to Answer

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Saving for financial independence

Modelling

a path to financial

independence

Example of a savings plan

Savings target

$100,000 in perpetuity **Growing at 3% per year above inflation**
Starting in 30 years

Savings

$100,000 now **Regular yearly savings of R**

Investment returns

Real returns of 8% per year (compounded yearly)

0	1	...	29	30	31	32	...
100,000	R	R	R	R	100,000	$100{,}000\times(1.03)$	
				A			
				S			

To calculate regular savings (R) …

1. **Calculate target future savings**

   $PV of all future cash flows at target date

2. **Calculate future value of existing savings**

   FV of single cash flow at target date

3. **Calculate future savings gap**

   Target future savings – FV of existing savings

4. **Calculate regular savings required**

   Future value of annuity formula

   Future value is savings gap and solve for R

Calculating regular savings (R)

1. **Calculate target future savings**

   \$100,000 perpetuity returning 8% growing at 3%

$$A = \frac{R_1}{(r-g)} = \frac{100{,}000}{(0.08-0.03)} = 2{,}000{,}000$$

2. **Calculate future value of existing savings**

   FV of \$100,000 in 30 years at 8%

$$F = P(1+r)^n = 100{,}000 \times 1.08^{30} = 1{,}006{,}226$$

Calculating regular savings (R)

3. Calculate future savings gap

Target future savings – FV of existing savings

$$2{,}000{,}000 - 1{,}006{,}226 = 993{,}734$$

4. Calculate regular savings required

Future value of annuity for gap solving for R

$$R = S \div \left(\frac{(1+r)^n - 1}{r} \right)$$

$$R = 993{,}734 \div \left(\frac{1.08^{30} - 1}{0.08} \right) \qquad R = 8{,}772.12 \text{ per year}$$

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Strategies for financial independence

3 key principles

1. **Consistently ‘save to invest’ 10% of your income**
2. **Avoid dumb investment decisions**
3. **Diversify across multiple financial strategies**

1. Invest in your ability to generate income

Your brain is your most valuable asset right now

If it can generate a graduate income of $50,000 growing at the rate of inflation at a required return of 6.5% per year then it is worth:

$$A = \frac{R_1}{(r - g)} = \frac{50{,}000}{0.065} = 769{,}231$$

Invest in ongoing work-relevant education

Invest in your physical and mental health

2. Invest in at least one property

Controls dwelling expenses over the long-term

Hopefully grows in value with average incomes

- Average incomes are expected to grow a bit less than Nominal GDP
- Nominal GDP = Inflation + Real GDP = (2% to 3%) + (2% to 3%)
- Estimated long-term growth in prices roughly 4% per year

You also save paying rent

- Rent is roughly 4% of property price
- So estimated long-term return on property = 4% + 4% = 8% per year

Only really need a 2 bedroom apartment in long-term

Useful as collateral on an investment loan to invest in shares and/or an investment property

3. Invest in shares using mutual funds

Provides growth over long-term plus a regular income through company profits distributed as dividends

Hopefully grows in value with nominal GDP

- **Nominal GDP = Inflation + Real GDP = (2% to 3%) + (2% to 3%)**
- **Estimated long-term growth in prices roughly 5% per year**

You also receive dividends (distributions of profits)

- **Average dividend yields are roughly 5% of share price**
- **So estimated long-term return on shares = 5% + 5% = 10% per year**

Best to invest in shares using fund managers

- **Don’t gamble by ‘picking stocks’ or ‘timing the market’**
- **More on this when we cover shares later in the course**

4. Use your retirement savings effectively

Retirement savings systems have tax advantages

Money going in often taxed less than personal income

Returns often taxed less than other investments

Retirement income often taxed less than other income

Details vary from country to country

Get to know your system early and use it effectively

5. Get involved in a start-up

Start-ups can generate millions of dollars of wealth in just a few years

They also provide valuable business lessons whether they succeed or fail

Avoid investing a significant amount of your own money

Best to join as a key staff member and negotiate a generous employee stock option plan (ESOP) in exchange for only a basic salary

‘Do your time’ for a few years then either switch to another startup if it fails or go back go a large corporate

Remember to diversify

Don’t rely on only one or two strategies

Best to diversify between three and four strategies

You need to be able to ...

1. **Clearly explain the concept of financial independence**
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4. **Calculate the future value of any existing investments**
5. **Calculate the amount that you need to save each year to achieve financial independence**
6. **Explain the key principles and strategies to achieve financial independence**

A1: Modelling financial independence

a) $$A_{\infty,g} = \frac{R_1}{(r-g)} = \frac{100{,}000}{0.065} = 1{,}538{,}462$$

b) $$A_{\infty,g} = \frac{R_1}{(r-g)} = \frac{100{,}000}{0.065+0.02} = 1{,}176{,}471$$

c) **No answer provided**
Use a similar approach to answer 1 above

Go to Question

A2: Planning to save

a)

$$F = P \times (1+r)^n$$

$$3{,}000 = P \times 1.005^{24}$$

$$P = 3{,}000 \div 1.005^{24} = 2{,}661.56$$

b)

$$S = R \times \left(\frac{(1+r)^n - 1}{r} \right) = 100 \times \left(\frac{1.01^{480} - 1}{0.01} \right) = 1{,}176{,}477$$

c)

$$R = S \div \left(\frac{(1+r)^n - 1}{r} \right) = 1{,}000{,}000 \div \left(\frac{1.12^{40} - 1}{0.12} \right) = 1{,}303.63$$

Go to Question