

CashCalc Specification Sheets (Client Facing)

Cash Flow Modeller

Overview of the tool

The Cash Flow Modeller is used for modelling and forecasting a client's total savings over a specific timeframe. It uses a number of assumptions around expected growth rates, inflation and tax in order to produce this forecast.

General structure of the calculator

All of the calculations are run on an annual basis. The calculator is based around the client's "total savings" at the start and end of each individual year. In order to calculate this, the user can enter some global assumptions as well as a variable number of entries in these 6 input categories: "Savings Pots", "Incomes", "Expenses", "Contributions", "Withdrawals" and "Charges/Fees".

Savings Pots

The client has one default Savings Pot entitled the "Current account". Any surplus income over expenditure in any given year is assumed to simply be added to this account (unless the "Save All Surplus" assumption states otherwise), and similarly in the event of a shortfall of income over expenditure in any given year the shortfall will be taken from here.

The user can also add an unlimited number of Savings Pots to the forecast. Each Savings Pot (including the "Current account") has a starting balance, an assumed net growth rate and, if the pot is a pension, an assumed tax rate for ad-hoc withdrawals. Note that the "Current account" cannot be labelled as a pension.

The user can also choose between a linear net growth rate or a variable growth rate. The user can choose from a list of 3 defaults:

- Mixed Benchmark: Cautious (0 – 35%) (1990-2019)
- Mixed Benchmark: Balanced (20-60%) (1990-2019)
- Mixed Benchmark: Adventurous (40-85%) (1990-2019)

Alternatively, the user can build their own fund portfolios and use them.

Incomes

The user can add an unlimited number of Incomes to the cash flow forecast. The user can choose between frequencies of: One-off incomes, weekly, monthly or annual incomes. If an income is not a One-off, a user can choose a start age and an end age for when the income is assumed to start and end (in whole years). The net amount entered is paid into the Current Account as per the frequency chosen.

There are choices for inflation rates, these consist of:

- Increase at the same rate as inflation – This income will increase at the same rate of the inflation listed in the users' assumptions
- Don't increase with inflation – This income will be reduced each year by the rate of inflation listed in the users' assumptions
- Increase at custom inflation rate – This income will increase at a defined rate of inflation

If an income is assumed to start in more than a years 'time, the user can choose if they want to "Adjust for inflation". By doing this the income will start at the value entered, otherwise the value entered will be reduced by inflation until it starts.

Incomes are assumed to come from an external source other than from the client's own money. Incomes are totalled each year in the "Total Incomes" column which is used in calculating the "Total Savings at Year End".

Expenses

Similarly to incomes, the user can add an unlimited number of expenditures. The user can choose between frequencies of: One-off expense, weekly, monthly or annual expenditure. If an expense is not a One-off, a user can choose a start age and an end age for when the expense is assumed to start and end (in whole years). The net amount entered is taken from the Current Account as per the frequency chosen. If there are insufficient funds in the current account or there is not enough income to subsidise the expenditure, the expenditure will be taken from the next available savings pot.

There are choices for inflation rates, these consist of:

- Increase at the same rate as inflation – This expense will increase at the same rate of the inflation listed in the users' assumptions
- Don't increase with inflation – This expense will be reduced each year by the rate of inflation listed in the users' assumptions
- Increase at custom inflation rate – This expense will increase at a defined rate of inflation

If an expense is assumed to start in more than a years 'time, the user can choose if they want to "Adjust for inflation". By doing this the expense will start at the value entered, otherwise the value entered will be reduced by inflation until it starts.

Expenses are totalled each year in the "Total Expenses" column which is used in calculating the "Total Savings at Year End". The Total Expenses are subtracted from the Total Incomes each year to give the "Total Surplus/Deficit".

Contributions

If the user has added at least 1 additional Savings Pot, they can add an unlimited number of Contributions. Contributions are assumed to be added to a specific Savings Pot of the user's choice. The user must choose whether the contribution is a "Personal Contribution" or an "External / Employer Contribution".

Personal Contributions are assumed to be taken from the client's Current account. This is effectively a transfer from one Savings pot to another. If the Personal Contribution is made to a Savings Pot which is a pension, this contribution will be "Grossed-up" by a user-specified percentage (default 20%) when added, which means that 125% of the specified contribution is added to the Savings Pot. Assuming a 20% rate, the gross contribution made is calculated by:

$$\text{Gross Contribution} = \frac{\text{Net Contribution}}{0.8}$$

External / Employer Contributions do not come from the client's Current account and are therefore assumed to come from an external source. These do not get "Grossed Up" when added to a pension. Note that if the client does not have enough surplus income and positive balance in their Current account to make the Personal Contribution, the Contribution will still occur and the client's Current account will enter an unlimited overdraft.

All of the additional parameters (starting date, ending date, growth rate, adjust for inflation) of Incomes & Expenditures also apply with Contributions.

Both "Personal Contributions" and "External / Employer Contributions" are combined to give the "Total Contributions" output, which is used in part to calculate the "Total Savings at Year End".

Withdrawals

Withdrawals fundamentally work in the opposite fashion to Personal Contributions. If the user has added more than 1 additional Savings Pot, they can make Withdrawals from Savings Pots.

Withdrawals are transfers of money from Savings Pots to the Current account. If the withdrawal is made from a Savings Pot which is classed as a Pension, the user must specify a percentage tax rate for this withdrawal. If the withdrawal has a tax rate which is not zero, we "Gross Up" the amount which is taken from the Savings Pot in order to ensure that the amount specified is added to the Current account. The following calculation applies in this specific case:

$$\text{Amount added to Current Account} = \text{Amount Specified}$$

$$\text{Amount taken from pension} = \frac{\text{Amount Specified}}{(1 - (\text{Withdrawal Tax Rate} / 100))}$$

If there is insufficient balance in the Savings Pot to take the full withdrawal, the maximum possible amount is taken instead. Similarly, if the Savings Pot in question has no balance, no withdrawal is taken.

If more than one percentage withdrawal is taken from a Savings Pot in the same year, the percentage taken will be relative to the value of the savings pot at the start of the year and not the reduced value after the previous withdrawal.

If more than one withdrawal is made in any given year from the same Savings Pot which is a pension, the withdrawals are prioritised in order from lowest tax rate to highest e.g. PCLS will be taken before any drawdown.

Charges & Fees

Charges & Fees work as a withdrawal from a Savings Pot, but they are not put into the Current Account and the money is discarded.

This feature can be used to show any adviser fees or platform charges that may apply to any of the Savings Pots that aren't the Current Account.

Much like Withdrawals, Charges & Fees have an option to be a percentage of the Savings Pot's starting value in that particular year. Note that if multiple charges / fees apply to a Savings Pot in a particular year and one is a percentage, the percentage always relates to the Savings Pot's value at the start of that year.

If a charge/fee is assumed to start in more than a year's time and is not a percentage, the user can choose if they want to "Adjust for inflation". By doing this the charge/fee will start at the value entered, otherwise the value entered will be reduced by inflation until it starts.

The value of the pots after a charge/fee has occurred is calculated by:

$$\text{Value of Savings} = \text{Value of Savings} * (1 - (\text{Percentage Fee}))$$

Where "Percentage Fee" is represented as a decimal.

Calculations Overview

The calculations are run on a loop on a year-by-year basis, starting from the client's birthday each year. The calculations are run in this order:

1. The "Total Savings at Year Start" value in the first year is simply the sum total of the Savings Pot values in that year. This is either the end balance from the previous year or, if the year is the first year of the calculation, this is the starting balance of each Savings Pot.
2. The "Total Income" plus "Total Withdrawals" over "Total Expenditure" plus "Total Contributions" (excluding employer's/external contributions) is calculated to give "Total Surplus/Deficit"
3. If the "Total Surplus/Deficit" is positive, this is added to the Current account. If, however the assumption "Save all Surplus Income" is set to be anything other than 100%, then only this percentage/amount of the "Total Surplus/Deficit" value is added to the Current account.
4. If the "Total Surplus/Deficit" is negative, the deficit is met by the Savings Pots in the order which they are ranked. This always tries to use the client's Current account first. Note that if any deficit is needed to be met by a Savings Pot which is a pension, the deficit is assumed to be taxed at the default tax rate of that Savings Pot. Pensions cannot be used to cover a deficit if the client's age is younger than 55. If there are no available pots, the deficit is then taken from the Current account as a 'last resort', but pushes the pot into an overdraft.
5. Once the deficit has been met (or the surplus has been added), the growth rates are then applied to each individual Savings Pot.
6. The sum total of all Savings Pots then give the value of the "Total Savings at Year End".

Calculating Growth on Incomes, Expenses, Contributions & Withdrawals

For each individual item entered, the following calculation is applied to calculate its value for the given year.

If the Item (i.e. an income, expense, contribution or withdrawal) is set to be "Adjusted for inflation":

Value this year = Amount Specified *

$$\left(\left(1 + \frac{\text{Custom Inflation Rate} - \text{Default Inflation Rate}}{100} \right) ^ {(\text{Current Age} - \text{Item Start Age})} \right)$$

If the Item is not "Adjusted for Inflation":

Value this year = Amount Specified *

$$\left(\left(1 + \frac{\text{Custom Inflation Rate} - \text{Default Inflation Rate}}{100} \right) ^ {(\text{Current Age} - \text{Item Start Age})} \right)$$

$$* \left(\left(1 - \frac{\text{Default Inflation Rate}}{100} \right) ^ {(\text{Item Start Age} - \text{Forecast Start Age})} \right)$$

The sum total of all incomes under this calculation gives the Total Income value; similarly, the sum total of all Expenses gives the Total Expense value.

Calculating growth rate on Savings Pots

Each Savings Pot must have an assumed “Net Growth Rate” value which the user enters themselves. The “Net Growth Rate” can be either a linear rate or a variable rate. Linear rates remain static throughout the duration of the forecast whereas variable rates can change year on year.

The growth rate which is actually applied at the end of each year of a forecast is the Real Return Rate. The Real Return Rate is calculated as follows:

$$\text{Savings Pot Real Return Rate (\%)} = \text{Net Growth Rate (\%)} - \text{Default Inflation Rate (\%)}$$

$$\text{Pot Value After Growth} = \text{Pot Value Before Growth} * \left(1 + \left(\frac{\text{Real Return Rate}}{100}\right)\right)$$

The net growth rate for the pot listed above is the net growth rate of the year that’s being calculated.

Stress Testing and Variable Growth

If a pot is linked to a variable growth rate/market event then the annual interest rate will differ as time goes on. If a pot is modelling a variable growth template and after the number of years of data in the template has passed, then the template will repeat itself until the end of the forecast.

A market event is the calculator’s way of modelling changes in the market such as the FTSE Market Crash of 2007-2009. This feature will override any variable growth templates that are currently in place.

The system comes with a series of defaults, including:

- UK Index Market Crash (2007-2009) – This contains the data of the crash that occurred between 2007 and 2009
- UK Index Market Crash and Recovery (2007-2012) – This contains the data of the crash that occurred between 2007 and 2009, including the resulting recovery
- UK Index Market Boom (1997-1999) – This contains the data of the spike that occurred between 1997 and 1999, this was a 34% increase in the market
- UK Index (Custom Timeframe) – This contains the data of the FTSE variations that occurred between 1985 and 2019, The user can choose the start and end year of the simulation
- 7% Average Returns – Poor Start (10 years) – This is a custom variation that was extracted from the R08 revision booklet, this starts at -11% and recovers to 21% over 10 years, averaging 7% returns
- 7% Average Returns – Good Start (10 years) - This is a custom variation that was extracted from the R08 revision booklet, this starts at 21% and drops to -11% over 10 years, averaging 7% returns

The user can also define their own market events to simulate.

Miscellaneous Assumptions

- Output figures are rounded to the nearest pound, all values in calculations are not rounded
- Growth is applied annually from the date that the forecast is created, this uses the value of the pot after any surplus/deficit has been accounted for
- All incomes/expenditure/contributions/withdrawals/charges & fees are assumed to occur on the first day of the year
- All values except for Employer Contributions are input as net
- All Contributions to a Savings Pot labelled as a pension are "grossed up" by a user-specified percentage
- By default, pensions cannot be used to automatically cover a shortfall if the client is younger than 55 at the time. This can however be overridden with the "Allow pensions to be used to cover a shortfall before age 55" advanced option. If the adviser enters an actual withdrawal from the pension when the client is younger than 55, the system will allow this to be taken regardless of the "Allow pensions to be used to cover a shortfall before age 55" setting.
- Forecasts can start from a minimum of the client's current age
- Assumed Inflation Rate has a range between 0.00% and 10.00% (Default: 2.00%)
- Retirement age defaults to state pension age
- Surplus Income to Save (%) has a range between 0.00% and 100.00% (Default: 100.00%)
- Surplus Income to Save (£) has a range between £0.00 and £100,000.00 (Default: £50,000.00)
- Variable Growth templates are not net of adviser/platform charges
- The default State Pension weekly income is set by the current government
- The State Pension age of a client is calculated by CashCalc's State Pension Age Calculator which follows the rules set by the current government

Appendix 01 – Mixed Benchmark: Cautious (0-35%) (1990-2019)

Year	1	2	3	4	5	6	7	8	9	10
Growth (%)	-12.51	9.00	22.40	26.02	-8.22	15.71	10.58	17.94	9.37	3.16
Year	11	12	13	14	15	16	17	18	19	20
Growth (%)	-3.16	11.79	1.95	-2.77	9.21	7.22	9.54	4.13	-2.24	-10.56
Year	21	22	23	24	25	26	27	28	29	30
Growth (%)	14.24	7.60	3.35	6.80	2.19	7.77	-2.98	9.46	4.37	-1.16

Appendix 02 – Mixed Benchmark: Balanced (20-60%) (1990-2019)

Year	1	2	3	4	5	6	7	8	9	10
Growth (%)	-16.50	13.18	16.20	28.70	-10.56	18.24	11.80	18.47	7.82	6.01
Year	11	12	13	14	15	16	17	18	19	20
Growth (%)	8.81	-6.59	-13.61	18.18	9.87	13.81	5.26	-1.97	-13.8	17.26
Year	21	22	23	24	25	26	27	28	29	
Growth (%)	9.07	0.81	9.07	4.69	8.36	-3.38	13.32	6.79	-2.54	

Appendix 03 – Mixed Benchmark: Adventurous (40-85%) (1990-2019)

Year	1	2	3	4	5	6	7	8	9	10
Growth (%)	-8.19	19.61	17.77	35.30	-11.89	23.64	8.26	12.78	10.67	17.90
Year	11	12	13	14	15	16	17	18	19	20
Growth (%)	2.62	-14.44	-20.81	23.29	9.67	21.28	6.97	-1.58	-16.89	20.21
Year	21	22	23	24	25	26	27	28	29	
Growth (%)	13.77	-1.40	10.76	6.72	9.19	-3.76	18.44	9.56	-3.00	

Appendix 04 – UK Index Market Crash (2007-2009)

Year	1	2	3
Growth (%)	6.56	-4.65	-34.91

Appendix 05 – UK Index Market Boom (1997-1999)

Year	1	2	3
Growth (%)	15.58	33.86	7.07

Appendix 06 – UK Index Custom Timeframe (1985-2019)

Year	1	2	3	4	5	6	7	8	9	10
Growth (%)	21.09	22.56	28.19	-10.63	13.21	12.63	5.56	7.61	11.94	16.04
Year	11	12	13	14	15	16	17	18	19	20
Growth (%)	-9.58	23.87	15.58	33.86	7.07	0.93	-5.05	-13.80	-28.34	22.89
Year	21	22	23	24	25	26	27	28	29	30
Growth (%)	10.60	16.56	6.56	-4.65	-34.91	39.80	11.94	-2.04	8.33	7.06
Year	31	32	33	34	35					
Growth (%)	2.01	-12.23	19.13	-0.43	-2.17					

Appendix 07 – 7% Average Returns Poor Start (10 years)

Year	1	2	3	4	5	6	7	8	9	10
Growth (%)	-11.00	-3.00	3.00	6.00	7.00	8.00	10.00	15.00	18.00	21.00

Appendix 08 – 7% Average Returns Good Start (10 years)

Year	1	2	3	4	5	6	7	8	9	10
Growth (%)	21.00	18.00	15.00	10.00	8.00	7.00	6.00	3.00	-3.00	-11.00