Investment Analyzer User Guide

This user guide focuses on the inputs of the Investment Analyzer and what they mean. They can be assembled into the input text files by manual entry, by spreadsheet, or any other convenient method. This guide does not discuss those methods. The input discussion is organized by the keywords recognized by the program and what they do.

# Input Files

Input files are in comma-delimited text format and are expected to have the file extension .INVA. Commas cannot be used within any of the strings in the input files, because they are reserved as a separator between fields. Either the field separator or the file extension could be changed, but would have to be changed in the program, so just don’t use commas in the name of anything.

Except for comment rows or blank rows, all rows in the input files start with a key word. This document provides a table explaining what key words are used and what data should follow each key word. The number of columns (or fields) for each key word includes the key word itself plus the number of data columns the program expects to find after it. If there are too few columns, the program will give an error. Qualifier columns are used to indicate which category or group of categories the data in the row belong to (e.g., which currency, portfolio, pension, or lifestyle). The table describes what data is expected, including its type. If a numerical value is expected and the program encounters a string instead, it issues an error. The table briefly describes the purpose of the data and indicates if it is part of the program output.

The program starts when you browse to find an input file you want to use. This file includes all the information required to run the analyzer, except for the answers to a few prompts the program may issue at run time. I am going to separate the tables into the keywords used for the Mixture function and the keywords used by the Stochastic function, because in some cases the same keywords are used differently and I think it will be less confusing this way.

## Mixture

The following table shows the keywords recognized:

| **Keyword** | **# of columns** | **Qualifier columns** | **Data columns** | **Data type** | **Purpose** |
| --- | --- | --- | --- | --- | --- |
| FILETYPE | 2 | N/A | File type | String | Confirm that value is “IADATA”. Otherwise error. |
| RUNTYPE | 2 | N/A | Type of run | String | Either “Mixture” or “Stochastic”, to determine whether you are trying to optimize the mixture of funds or do a stochastic run to find out if you will have enough money. Should be “Mixture” in this case. |
| SOFTWAREVERSION | 2 | N/A | Software version file is made for | Real | Confirm input file matches software version. Otherwise error. |
| NAME | 2 | N/A | Name of run | String | Just so you can give a name to the run you are doing |
| STARTYEAR | 2 | N/A | Start year | Positive integer | Starting year for the fund return data |
| NUMYEARS | 2 | N/A | Number of years | Positive integer | Number of years of fund return data |
| STEPSIZEMAX | 2 | N/A | Largest step size the program will use for fund allocation | Positive integer in {100, 50, 25, 20, 10 5, 4, 2, 1} | Specifies the largest step size the program will use for fund allocation, in its first pass |
| STEPSIZEMIN | 2 | N/A | Smallest step size the program will use for fund allocation | Positive integer in {100, 50, 25, 20, 10 5, 4, 2, 1} | Specifies the smallest step size the program will use for fund allocation, in its last pass |
| NUMPORTFOLIO | 2 | N/A | Number of target portfolios | Positive integer | Number of target portfolios, for specifying return and variability you want |
| PORTFOLIO | 5 | N/A | Portfolio names, Portfolio short names, Target return, Target standard deviation | 2 Strings, 2 real numbers | Portfolio names are the names of each portfolio. Short names are used for certain output. The target return and standard deviation describe how you hope the portfolio will perform. |
| NUMFUNDS | 2 | N/A | Number of funds | Positive integer | Number of funds with investment return information |
| FUND | 4 + NUMYEARS | N/A | Fund ticker,  Fund name,  Limit on maximum allocation for fund,  Returns for each year | 2 Strings, 1 integer, real numbers for each year | Fund ticker symbol (or short name), fund name, the limit on maximum allocation for a fund (may reduce runtime). Then the total return data for the fund, year by year. |
| OUTPUTFOLDER | 2 | N/A | Folder path | String | Path where output files are to go. |
| OUTPUTFILE | 2 | N/A | Filename | String | Name of output file. |
| Comment lines | N/A | N/A | N/A | String | Any row beginning with a single quote is a comment and is ignored. |
| Blank lines | N/A | N/A | N/A | N/A | Blank lines are skipped |

## Stochastic

The following table shows the keywords recognized:

| **Keyword** | **# of columns** | **Qualifier columns** | **Data columns** | **Data type** | **Purpose** |
| --- | --- | --- | --- | --- | --- |
| FILETYPE | 2 | N/A | File type | String | Confirm that value is “IADATA”. Otherwise error. |
| RUNTYPE | 2 | N/A | Type of run | String | Either “Mixture” or “Stochastic”, to determine whether you are trying to optimize the mixture of funds or do a stochastic run to find out if you will have enough money. Should be “Stochastic” in this case. |
| SOFTWAREVERSION | 2 | N/A | Software version file is made for | Real | Confirm input file matches software version. Otherwise error. |
| NAME | 2 | N/A | Name of run | String | Just so you can give a name to the run you are doing |
| STARTYEAR | 2 | N/A | Start year | Positive integer | Starting year for the stochastic run – might be the current year, for example |
| BIRTHYEAR | 2 | N/A | Birth year | Positive integer | Year when the person was born (if doing a plan for two people, pick the birth year for one of them and use that year to calculate ages, such as when pensions will start, for both) |
| ENDAGE | 2 | N/A | End age | Positive integer | If planning retirement, this is the minimum age you want the money to last until (i.e., when you think you might croak) |
| ENDAGES | 3 | N/A | Earliest end age and latest end age | Positive integers | If you are already retired, specify a range of possible end ages to use (basically the range of life expectancies you want to try) |
| RETIREMENTAGE | 3 | N/A | Earliest retirement age and latest retirement age | Positive integers | If you are still planning retirement, specify a range of possible retirement ages to try. If you are already retired, make them both the same and equal to when you actually retired. |
| GROSSINCOME | 2 | N/A | Gross income | Real number | The gross income upon which you will base your retirement spending estimates. This way, the number for each year can just be something simple, like 0.6 |
| NUMLIFESTYLES | 2 | N/A | Number of retirement lifestyles to explore | Positive integer | Number of retirement lifestyles or expenditures you want to explore. Could include different patterns like jumps due to higher health care costs that might occur in different years. |
| LIFESTYLE | 3 plus enough year columns to cover from earliest retirement age to latest end age | N/A | Lifestyle short name, Lifestyle name, income fractions for each retirement year | 2 strings, the rest are real numbers | For each lifestyle, specifies a spending pattern year by year based on fractions of the GROSSINCOME. You need enough numbers to cover the whole period from earliest retirement age to latest end age. You can put in extra ones. If not needed, they will just be ignored. |
| NUMCURRENCIES | 2 | N/A | Number of currencies in which you have investment accounts | Positive integer | If you have accounts in more than one country, you might need this. Otherwise, just set it to one. |
| CURRENCY | 5 | N/A | Currency symbol, currency name, current conversion rate, expected annual change in conversion rate | 2 Strings, 2 real numbers | Always specify the first currency to be the one for the country where you will be retired. Its conversion rate will be 1 and its expected annual change will be 0. Exchange rate for other currencies would be the amount required to buy your home currency (so if currency 2 is US$ and home currency is C$, rate for currency 2 is about 0.78 these days). Expected change is calculated by dividing the current exchange rate by an old one, taking the nth root, where n is the number of years between those rates, and subtracting from 1. If your home currency has been rising compared to this one, it should be positive. |
| INFLATION | 2 | N/A | Expected inflation rate | Real number | Expected inflation rate in the country where you plan to be retired |
| RETIREDTAXRATE | 2 | N/A | Expected tax rate in retirement | Real number | Estimated tax rate when you’re retired. This is average rate, not marginal rate. |
| RETIREDRETURNFACTOR | 2 | N/A | Expected factor by which returns will be reduced in retirement | Real number | This is the factor you want to use to reduce your average returns (and volatility) during retirement, because you will likely invest more conservatively. |
| NUMTRIALS | 2 | N/A | Number of trials for each age and lifestyle | Positive integer | This is the number of random walks the program will take with your portfolio, for each of your lifestyle patterns and ages. It runs really fast, so you can use a pretty big number. I usually use 1000, but a bigger number would work fine. |
| NUMPENSIONS | 2 | N/A | Number of pensions | Positive integer | This is the number of government or company pensions you expect to collect that have some kind of defined benefit. |
| PENSION | 9 plus enough for years from earliest pension age to fixed pension age | N/A | Pension short name, Pension name, Currency symbol, Taxable flag, Indexed flag, Full pension amount, Earliest pension age, Fixed pension age, Ratios of pension to full amount for each year | 5 strings, 1 real number, 2 positive integers, rest are real numbers | Each pension has a short name (used in some charts), a longer name, and a currency in which it is paid. If it is taxable, enter “Yes”. If it is indexed to inflation, enter “Yes”. Full amount is the annual amount paid if the pension starts at its normal age. Earliest pension age is the earliest age at which you can collect. Fixed pension age is the age after which there are no further increases from delaying starting it. The ratios are the ratio of the pension amount if it starts at a particular age divided by its normal full amount. For example, if you delay Canada Pension to start at 70 instead of 65, you will get 42% more per year. |
| STARTPENSION | 3 | Pension short name | Age when you plan to start this pension | Positive integer | This is the age when you think you will start collecting this pension. |
| NUMCURRENTPORTFOLIOS | 2 | N/A | Number of portfolios in which your funds are organized | Positive integer | This allows you to separate your funds by currency, or into RRSPs, TFSAs, IRAs, taxable accounts, or whatever. |
| CURRENTPORTFOLIO | 6 | N/A | Portfolio name, Currency symbol, Starting tax exempt amount, Starting tax sheltered amount, Starting taxable amount | 2 strings, 3 real numbers | Each portfolio has a name and an indication of which currency it is in. Tax exempt refers to things like TFSAs in Canada or Roth IRAs in the US. Tax sheltered refers to things like RRSPs in Canada or traditional IRAs in the US. Taxable is just regular accounts. If your first portfolio is called TFSA, you would specify its current value under tax-exempt and put zeroes in the other two spots. |
| CONTRIBUTION | 5 plus enough for years from now until latest retirement age | Portfolio name | Tax exempt contribution, Tax sheltered contribution, Taxable contribution, Ratio of a given year’s contribution to these amounts | 1 string, rest are real numbers | For each portfolio where you still plan to make contributions, specify the annual contribution amount in the three categories (or just one if you like, with the others as zeroes), and then for each year specify the ratio of that year’s contribution to the specified amount. If your contribution will always be the same, you can just put in 1 for each year. Once you retire, contributions are assumed to stop. |
| RETURNYEARS | 5 | Portfolio name | Number of investments in portfolio, first and last years for which you have returns data | Positive integers | For each portfolio, specify how many kinds of investments are in it and the first and last year for which you will enter returns data |
| INVESTMENT | 4 plus enough for number of returns data years | Portfolio name | Investment name, Investment mix percent, Total return for each year | 1 string, rest are real | For each investment in each portfolio, specify what it is called, its proportion of the portfolio it is part of, and its total return for each year |
| OUTPUTFOLDER | 2 | N/A | Folder path | String | Path where output files are to go. |
| OUTPUTFILE | 2 | N/A | Filename | String | Name of output file. |
| Comment lines | N/A | N/A | N/A | String | Any row beginning with a single quote is a comment and is ignored. |
| Blank lines | N/A | N/A | N/A | N/A | Blank lines are skipped |