Synaptic Risk Service

Metrics Methodology

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Synaptic use the Moody's stochastic Wealth Scenario Generator (WSG) engine to determine risk ratings. It runs 1000 economic scenarios - the engine inputs an asset split, investment amount & term and outputs a number/value for each of the 1000 scenarios for each year the projection spans over. For example, a ten-year projection would output 10,000 numbers which may be represented in a table similar to the one below:

Scenario no.	Year 1	Year 2	Year 3	Year 4	……	Year 10
1	10101	10370	10834	10911	…	15559
2	10126	10517	10375	11079	…	13259
3	10536	10802	11354	12458	…	15551
…	…	…	…	…	…	…
1000	10520	11199	11093	11531	…	13551

From these multiple scenarios we derive a spread of possible investment outcomes, from which Synaptic then calculate various metrics for the minimum, maximum and mean gain (growth) values as defined below.

Inputs

Synaptic input into the engine the asset split supplied, a term of 10 years and a lump sum amount of £10,000. Synaptic also set the projection to rebalance itself each year (i.e. maintain the asset class split) and to run on a nominal basis which means inflation assumptions are not taken into account E.g. money's worth. The reason for this is to maintain the integrity of the asset split and the actual growth of each scenario from one year to the next.

Outputs

In order to determine any growth metrics, growth in each year of each scenario is calculated in the following manner:

- Value in year 2 minus the value in year 1 giving the difference in values between the two years.
- The value above is then divided by the year 1 figure to calculate the growth from year 1 to year 2.
- For example.
  - Year 1 value = 10000
  - Year 2 value = 9876
  - Growth = (9876-10000)/10000 = (-124)/10000 = -0.0124 = -1.24%

This produces a new table - similar to the earlier results table of 1000 growth values for each year of the projection. Figures are then sorted (for each year) in ascending order and the 50th and 950th values are selected. This represents the 5th and 95th percentiles which are the minimum and maximum gain values. These values by default have a 5% chance of happening (as they are the 5th percentile from the sample range). They, therefore, have a once in twenty-year chance of occurring in any given year.

For the minimum value, we look at the minimum value for *each* year and pick the minimum. The same is done for the maximum value but taking the maximum.

The absolute minimum and maximum are of course the first and last values from the table of 1000 growth values (i.e. the 1st and 1000th). However, these values are not used as they are the extremes of the distribution and only have a 0.1% (or once in one thousand years) chance of occurring, making them misrepresentative to the client.

The mean value is calculated on a different basis to the minimum and maximum values. The mean gain returned is the average of all of the growth values. i.e. the sum of all the expected growth outcomes are added and then divided by the number of values to get an arithmetic mean. This differs to the minimum and maximum gains which are percentile reference points from the distribution of results.

Assigning a Rating

The risk levels have been created to target minimum gain boundaries.

Moody's supply a file each quarter to calibrate their stochastic engine in line with the latest economic variables such as interest rates and inflation. Due to the quarterly update of the data in the engine, the minimum gain boundaries do move from time to time.

Strategic asset allocation models are produced which are designed to align with each minimum gain boundary – therefore demonstrating a portfolio model can be represented for each risk category and that each category consistently provides increasing returns (growth, measured by the corresponding mean gain metric) without exposure to excessive levels of risk.

For example, where a portfolio targeted to meet the Very / Adventurous boundary requires an excessive proportion of assets in higher risk areas such as Emerging Markets Equities but this does not result in any increase in the mean gain compared to the Moderately Adventurous category, the boundaries would then be subject to review to remain relevant in keeping with latest market conditions.

Synaptic Software Limited supply the boundaries used on each quarterly review.

The current boundaries are:

Asset allocation name	Min Gain	Attitude to Risk	Risk Rating
Cautious	-6.50	Cautious	1.9
Moderately Cautious	-11.50	Moderately Cautious	2.9
Balanced	-16.50	Balanced	3.9
Moderately Adventurous	-21.50	Moderately Adventurous	4.9
Adventurous	-24.00	Adventurous	5.4

Asset allocation name	Min Gain	Attitude to Risk	Risk Rating
Very Cautious	-4.00	Very Cautious	1
Cautious	- 6.50	Cautious	2
Moderately Cautious (Low End)	-9.00	Moderately Cautious (High End)	3
Moderately Cautious (High End)	-11.50	Moderately Cautious (Low End)	4
Balanced (Low End)	-14.00	Balanced (Low End)	5
Balanced (High End)	-16.50	Balanced (High End)	6
Moderately Adventurous (Low End)	-19.00	Moderately Adventurous (Low End)	7
Moderately Adventurous (High End)	-21.50	Moderately Adventurous (High End)	8
Adventurous	-23.00	Adventurous	9
Very Adventurous	-24.00	Very Adventurous	9