|  |
| --- |
| Milliman Standard Calibration Report |
| @@CALIBDATE@@ |
| Prepared by:  Craig McCulloch  FIAA  Rudi Puchy  FIA, CFA |

**Table of Contents**

[Section 1 Introduction 4](#_Toc474435208)

[1.1. Background 4](#_Toc474435209)

[1.2. Objective 4](#_Toc474435210)

[1.3. Methodology 4](#_Toc474435211)

[1.4. Reliance and Limitations 5](#_Toc474435212)

[Section 2 Interest Rates (2 Factor Hull White) 6](#_Toc474435213)

[2.1. Introduction 6](#_Toc474435214)

[2.2. Parameters 6](#_Toc474435215)

[2.3. Input Yield Curve 6](#_Toc474435216)

[2.4. Distributions 7](#_Toc474435217)

[Section 3 Inflation 11](#_Toc474435218)

[3.1. Introduction 11](#_Toc474435219)

[Section 4 Consumer Price Inflation (Vasicek) 12](#_Toc474435220)

[4.1. Parameters 12](#_Toc474435221)

[4.2. Distributions 12](#_Toc474435222)

[Section 5 Average Weekly Earnings (Vasicek) 14](#_Toc474435223)

[5.1. Parameters 14](#_Toc474435224)

[5.2. Distributions 14](#_Toc474435225)

[Section 6 Equity Assets 16](#_Toc474435226)

[Section 7 Australian Equities 17](#_Toc474435227)

[7.1. Parameters 17](#_Toc474435228)

[7.2. Distributions 18](#_Toc474435229)

[Section 8 International Equities Hedged 20](#_Toc474435230)

[8.1. Parameters 20](#_Toc474435231)

[8.2. Distributions 21](#_Toc474435232)

[Section 9 International Equities Unhedged 23](#_Toc474435233)

[9.1. Parameters 23](#_Toc474435234)

[9.2. Distributions 24](#_Toc474435235)

[Section 10 Emerging Market Equities Unhedged 25](#_Toc474435236)

[10.1. Parameters 26](#_Toc474435237)

[10.2. Distributions 27](#_Toc474435238)

[Section 11 Fixed Income Assets 29](#_Toc474435239)

[11.1. Overview 29](#_Toc474435240)

[Section 12 Australian Fixed Interest Government 30](#_Toc474435241)

[12.1. Parameters 30](#_Toc474435242)

[12.2. Distributions 31](#_Toc474435243)

[Section 13 Australian Fixed Interest Corporate 32](#_Toc474435244)

[13.1. Parameters 33](#_Toc474435245)

[13.2. Distributions 34](#_Toc474435246)

[Section 14 International Fixed Interest Govt Hedged 35](#_Toc474435247)

[14.1. Parameters 36](#_Toc474435248)

[14.2. Distributions 37](#_Toc474435249)

[Section 15 Other Assets 38](#_Toc474435250)

[15.1. Overview 39](#_Toc474435251)

[Section 16 Australian Listed Property 40](#_Toc474435252)

[16.1. Parameters 40](#_Toc474435253)

[16.2. Distributions 41](#_Toc474435254)

[Section 17 Australian Direct Property 42](#_Toc474435255)

[17.1. Parameters 43](#_Toc474435256)

[17.2. Distributions 44](#_Toc474435257)

[Section 18 International Alternatives Hedged 45](#_Toc474435258)

[18.1. Parameters 46](#_Toc474435259)

[18.2. Distributions 47](#_Toc474435260)

[Section 19 Australian Infrastructure 48](#_Toc474435261)

[19.1. Parameters 49](#_Toc474435262)

[19.2. Distributions 50](#_Toc474435263)

[Section 20 Correlations 51](#_Toc474435264)

[20.1. Overview 52](#_Toc474435265)

[20.2. Asset class correlations 52](#_Toc474435266)

1. Introduction
   1. Background
      1. This document details the @@CALIBDATE@@ economic scenario generation standard calibration of the Milliman Analytic Platform (“the Platform”) Calculation Engine.
      2. This document shows how the parameters of the models have changed since the prior calibration and their impact on the resulting asset class return and other economic variable distributions.
      3. The document is intended to provide information that will allow the user of the Platform to assess whether the standard calibration is suitable for their purposes.
   2. Objective
      1. This calibration is designed to model the long-term to ultra-long-term dynamics of financial markets, specifically for interest rates, inflation, and asset returns in a real-world context. It should be noted that the standard calibration and model configuration is not designed for projections terms of less than three years, and may not be suitable for such purposes.
      2. The calibration primarily focuses on long-term data in order to derive parameters for the models, with the exception of interest rates and inflation where the current yield curve and inflation will be used to initialise the model.
   3. Methodology
      1. The methodology followed within this calibration is detailed in the document “*Calibration - Approach, targets and validation*”.
      2. Targets for asset classes have been set through the use of both historical data analysis and expert judgment. The overriding principle used to set asset class target distributions is to maintain broadly constant risk adjusted returns so that no asset class is favoured over the other during a simulation.
      3. All simulation results shown in this document have been produced based on the relevant calibration run by simulating 5,000 economic scenarios over 30 yearly timesteps.
   4. Reliance and Limitations
      1. The calibrations and model setup contained in this document represent one of many possible viable model configurations. Many alternative configurations are feasible and can be implemented within the Platform.
      2. Milliman does not recommend or endorse the use of the calibrations contained within this document for any particular client. It remains the responsibility of each user of the Platform to assess whether or not this calibration meets their specific needs and is fit for their modelling purposes.
      3. This report was prepared solely to provide assistance to licensed users of the Platform and / or Calculation Engine. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this report. Milliman recommends that any recipient of this report be aided by its own actuary or other qualified professional when reviewing the report. Milliman does not certify the information in this report, nor does it guarantee the accuracy, completeness, efficacy, or timeliness of such information. Use of such information is voluntary and should not be relied upon unless an independent review of its accuracy, completeness, efficacy, and timeliness has been performed. Materials may not be reproduced without the express consent of Milliman.
      4. The calibration and use of stochastic economic scenarios is a complex area. Users of this calibration should ensure that they have sufficient technical knowledge to interpret the results and understand the implications of this calibration. The parameterisation and configuration of economic models are a key input into the Calculation Engine. Small changes to certain parameters can have a large impact on final results.
2. Interest Rates (2 Factor Hull White)
   1. Introduction
      1. The initial yield curve is calibrated by making use of the Reserve Bank of Australia published yield curve as at the end of the quarter. Yield curve extrapolation is performed using the Smith-Wilson method parameterised by an Ultimate Forward Rate of 4.4%p.a. compounded annually and a convergence parameter of 0.1. (Prior to 2017 a constant forward rate assumption was used past year 10).
      2. The distribution of the interest rate model has been calibrated using historical data and expert judgement. The data was used to obtain a target distribution of the relative movements of the yield curve. The model parameters were then optimised to match the percentiles of the targeted distribution of relative interest rate movements as far as possible.
      3. The standard calibration makes use of 2 Factor Hull White interest rate model for nominal interest rates. The model has the following key features
         * Two sources of risk, this will allow for more complex yield curve shapes than a simple single factor model.
         * Direct input of the initial yield curve.
         * The short rate and forward rates are normally distributed.
         * The short rate process reverts to a long term mean reversion level.
         * The model can produce negative interest rates, depending on the calibration.
   2. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **@@OLDDATE@@** | **@@CALIBDATE@@** | **Description** |
|  | @@OLDHWALPHAS@@ | @@NEWHWALPHAs@@ | The mean reversion speed of the short rate process. |
|  | @@OLDHWALPHAA@@ | @@NEWHWALPHAA@@ | The mean reversion speed of the alternative process |
|  | @@OLDHWSIGMAS@@ | @@NEWHWSIGMAS@@ | The volatility of the short rate process |
|  | @@OLDHWSIGMAA@@ | @@NEWHWSIGMAA@@ | The volatility of the alternative process |
|  | @@OLDHWGAMMA@@ | @@NEWHWGAMMA@@ | The market price of risk of the short rate process. |

* 1. Input Yield Curve

@@YIELDCURVECHART@@

* 1. Distributions
     1. Cash Total Return Percentiles – Continuously Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDCASH1\_5@@ | @@OLDCASH5\_5@@ | @@OLDCASH10\_5@@ | @@OLDCASH15\_5@@ | @@OLDCASH25\_5@@ | @@OLDCASH30\_5@@ |
| 25% | @@OLDCASH1\_25@@ | @@OLDCASH5\_25@@ | @@OLDCASH10\_25@@ | @@OLDCASH15\_25@@ | @@OLDCASH25\_25@@ | @@OLDCASH30\_25@@ |
| 50% | @@OLDCASH1\_50@@ | @@OLDCASH5\_50@@ | @@OLDCASH10\_50@@ | @@OLDCASH15\_50@@ | @@OLDCASH25\_50@@ | @@OLDCASH30\_50@@ |
| 75% | @@OLDCASH1\_75@@ | @@OLDCASH5\_75@@ | @@OLDCASH10\_75@@ | @@OLDCASH15\_75@@ | @@OLDCASH25\_75@@ | @@OLDCASH30\_75@@ |
| 95% | @@OLDCASH1\_95@@ | @@OLDCASH5\_95@@ | @@OLDCASH10\_95@@ | @@OLDCASH15\_95@@ | @@OLDCASH25\_95@@ | @@OLDCASH30\_95@@ |
| Mean | @@OLDCASH1\_MU@@ | @@OLDCASH5\_MU@@ | @@OLDCASH10\_MU@@ | @@OLDCASH15\_MU@@ | @@OLDCASH25\_MU@@ | @@OLDCASH30\_MU@@ |
| Volatility | @@OLDCASH1\_VOL@@ | @@OLDCASH5\_VOL@@ | @@OLDCASH10\_VOL@@ | @@OLDCASH15\_VOL@@ | @@OLDCASH25\_VOL@@ | @@OLDCASH30\_VOL@@ |

* + 1. Cash Total Return Percentiles – Continuously Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWCASH1\_5@@ | @@NEWCASH5\_5@@ | @@NEWCASH10\_5@@ | @@NEWCASH15\_5@@ | @@NEWCASH25\_5@@ | @@NEWCASH30\_5@@ |
| 25% | @@NEWCASH1\_25@@ | @@NEWCASH5\_25@@ | @@NEWCASH10\_25@@ | @@NEWCASH15\_25@@ | @@NEWCASH25\_25@@ | @@NEWCASH30\_25@@ |
| 50% | @@NEWCASH1\_50@@ | @@NEWCASH5\_50@@ | @@NEWCASH10\_50@@ | @@NEWCASH15\_50@@ | @@NEWCASH25\_50@@ | @@NEWCASH30\_50@@ |
| 75% | @@NEWCASH1\_75@@ | @@NEWCASH5\_75@@ | @@NEWCASH10\_75@@ | @@NEWCASH15\_75@@ | @@NEWCASH25\_75@@ | @@NEWCASH30\_75@@ |
| 95% | @@NEWCASH1\_95@@ | @@NEWCASH5\_95@@ | @@NEWCASH10\_95@@ | @@NEWCASH15\_95@@ | @@NEWCASH25\_95@@ | @@NEWCASH30\_95@@ |
| Mean | @@NEWCASH1\_MU@@ | @@NEWCASH5\_MU@@ | @@NEWCASH10\_MU@@ | @@NEWCASH15\_MU@@ | @@NEWCASH25\_MU@@ | @@NEWCASH30\_MU@@ |
| Volatility | @@NEWCASH1\_VOL@@ | @@NEWCASH5\_VOL@@ | @@NEWCASH10\_VOL@@ | @@NEWCASH15\_VOL@@ | @@NEWCASH25\_VOL@@ | @@NEWCASH30\_VOL@@ |

* + 1. Total Return Charts – Continuously Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDHWCASHPERCENTILE@@ | @@OLDHWHIST@@ |

* + 1. Total Return Charts – Continuously Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWHWPERCENTILE@@ | @@NEWHWHIST@@ |

* + 1. 1yr Continuously Compounded Spot Rate Percentiles (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDSPOT11\_5@@ | @@OLDSPOT15\_5@@ | @@OLDSPOT110\_5@@ | @@OLDSPOT115\_5@@ | @@OLDSPOT125\_5@@ | @@OLDSPOT130\_5@@ |
| 25% | @@OLDSPOT11\_25@@ | @@OLDSPOT15\_25@@ | @@OLDSPOT110\_25@@ | @@OLDSPOT115\_25@@ | @@OLDSPOT125\_25@@ | @@OLDSPOT130\_25@@ |
| 50% | @@OLDSPOT11\_50@@ | @@OLDSPOT15\_50@@ | @@OLDSPOT110\_50@@ | @@OLDSPOT115\_50@@ | @@OLDSPOT125\_50@@ | @@OLDSPOT130\_50@@ |
| 75% | @@OLDSPOT11\_75@@ | @@OLDSPOT15\_75@@ | @@OLDSPOT110\_75@@ | @@OLDSPOT115\_75@@ | @@OLDSPOT125\_75@@ | @@OLDSPOT130\_75@@ |
| 95% | @@OLDSPOT11\_95@@ | @@OLDSPOT15\_95@@ | @@OLDSPOT110\_95@@ | @@OLDSPOT115\_95@@ | @@OLDSPOT125\_95@@ | @@OLDSPOT130\_95@@ |
| Mean | @@OLDSPOT11\_MU@@ | @@OLDSPOT15\_MU@@ | @@OLDSPOT110\_MU@@ | @@OLDSPOT115\_MU@@ | @@OLDSPOT125\_MU@@ | @@OLDSPOT130\_MU@@ |
| Volatility | @@OLDSPOT11\_VOL@@ | @@OLDSPOT15\_VOL@@ | @@OLDSPOT110\_VOL@@ | @@OLDSPOT115\_VOL@@ | @@OLDSPOT125\_VOL@@ | @@OLDSPOT130\_VOL@@ |

* + 1. 1yr Continuously Compounded Spot Rate Percentiles (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWSPOT11\_5@@ | @@NEWSPOT15\_5@@ | @@NEWSPOT110\_5@@ | @@NEWSPOT115\_5@@ | @@NEWSPOT125\_5@@ | @@NEWSPOT130\_5@@ |
| 25% | @@NEWSPOT11\_25@@ | @@NEWSPOT15\_25@@ | @@NEWSPOT110\_25@@ | @@NEWSPOT115\_25@@ | @@NEWSPOT125\_25@@ | @@NEWSPOT130\_25@@ |
| 50% | @@NEWSPOT11\_50@@ | @@NEWSPOT15\_50@@ | @@NEWSPOT110\_50@@ | @@NEWSPOT115\_50@@ | @@NEWSPOT125\_50@@ | @@NEWSPOT130\_50@@ |
| 75% | @@NEWSPOT11\_75@@ | @@NEWSPOT15\_75@@ | @@NEWSPOT110\_75@@ | @@NEWSPOT115\_75@@ | @@NEWSPOT125\_75@@ | @@NEWSPOT130\_75@@ |
| 95% | @@NEWSPOT11\_95@@ | @@NEWSPOT15\_95@@ | @@NEWSPOT110\_95@@ | @@NEWSPOT115\_95@@ | @@NEWSPOT125\_95@@ | @@NEWSPOT130\_95@@ |
| Mean | @@NEWSPOT11\_MU@@ | @@NEWSPOT15\_MU@@ | @@NEWSPOT110\_MU@@ | @@NEWSPOT115\_MU@@ | @@NEWSPOT125\_MU@@ | @@NEWSPOT130\_MU@@ |
| Volatility | @@NEWSPOT11\_VOL@@ | @@NEWSPOT15\_VOL@@ | @@NEWSPOT110\_VOL@@ | @@NEWSPOT115\_VOL@@ | @@NEWSPOT125\_VOL@@ | @@NEWSPOT130\_VOL@@ |

* + 1. 10yr Continuously Compounded Spot Rate Percentiles (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDSPOT101\_5@@ | @@OLDSPOT105\_5@@ | @@OLDSPOT1010\_5@@ | @@OLDSPOT1015\_5@@ | @@OLDSPOT1025\_5@@ | @@OLDSPOT1030\_5@@ |
| 25% | @@OLDSPOT101\_25@@ | @@OLDSPOT105\_25@@ | @@OLDSPOT1010\_25@@ | @@OLDSPOT1015\_25@@ | @@OLDSPOT1025\_25@@ | @@OLDSPOT1030\_25@@ |
| 50% | @@OLDSPOT101\_50@@ | @@OLDSPOT105\_50@@ | @@OLDSPOT1010\_50@@ | @@OLDSPOT1015\_50@@ | @@OLDSPOT1025\_50@@ | @@OLDSPOT1030\_50@@ |
| 75% | @@OLDSPOT101\_75@@ | @@OLDSPOT105\_75@@ | @@OLDSPOT1010\_75@@ | @@OLDSPOT1015\_75@@ | @@OLDSPOT1025\_75@@ | @@OLDSPOT1030\_75@@ |
| 95% | @@OLDSPOT101\_95@@ | @@OLDSPOT105\_95@@ | @@OLDSPOT1010\_95@@ | @@OLDSPOT1015\_95@@ | @@OLDSPOT1025\_95@@ | @@OLDSPOT1030\_95@@ |
| Mean | @@OLDSPOT101\_MU@@ | @@OLDSPOT105\_MU@@ | @@OLDSPOT1010\_MU@@ | @@OLDSPOT1015\_MU@@ | @@OLDSPOT1025\_MU@@ | @@OLDSPOT1030\_MU@@ |
| Volatility | @@OLDSPOT101\_VOL@@ | @@OLDSPOT105\_VOL@@ | @@OLDSPOT1010\_VOL@@ | @@OLDSPOT1015\_VOL@@ | @@OLDSPOT1025\_VOL@@ | @@OLDSPOT1030\_VOL@@ |

* + 1. 10yr Continuously Compounded Spot Rate Percentiles (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWSPOT101\_5@@ | @@NEWSPOT105\_5@@ | @@NEWSPOT1010\_5@@ | @@NEWSPOT1015\_5@@ | @@NEWSPOT1025\_5@@ | @@NEWSPOT1030\_5@@ |
| 25% | @@NEWSPOT101\_25@@ | @@NEWSPOT105\_25@@ | @@NEWSPOT1010\_25@@ | @@NEWSPOT1015\_25@@ | @@NEWSPOT1025\_25@@ | @@NEWSPOT1030\_25@@ |
| 50% | @@NEWSPOT101\_50@@ | @@NEWSPOT105\_50@@ | @@NEWSPOT1010\_50@@ | @@NEWSPOT1015\_50@@ | @@NEWSPOT1025\_50@@ | @@NEWSPOT1030\_50@@ |
| 75% | @@NEWSPOT101\_75@@ | @@NEWSPOT105\_75@@ | @@NEWSPOT1010\_75@@ | @@NEWSPOT1015\_75@@ | @@NEWSPOT1025\_75@@ | @@NEWSPOT1030\_75@@ |
| 95% | @@NEWSPOT101\_95@@ | @@NEWSPOT105\_95@@ | @@NEWSPOT1010\_95@@ | @@NEWSPOT1015\_95@@ | @@NEWSPOT1025\_95@@ | @@NEWSPOT1030\_95@@ |
| Mean | @@NEWSPOT101\_MU@@ | @@NEWSPOT105\_MU@@ | @@NEWSPOT1010\_MU@@ | @@NEWSPOT1015\_MU@@ | @@NEWSPOT1025\_MU@@ | @@NEWSPOT1030\_MU@@ |
| Volatility | @@NEWSPOT101\_VOL@@ | @@NEWSPOT105\_VOL@@ | @@NEWSPOT1010\_VOL@@ | @@NEWSPOT1015\_VOL@@ | @@NEWSPOT1025\_VOL@@ | @@NEWSPOT1030\_VOL@@ |

* + 1. 30yr Continuously Compounded Spot Rate Percentiles (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDSPOT301\_5@@ | @@OLDSPOT305\_5@@ | @@OLDSPOT3010\_5@@ | @@OLDSPOT3015\_5@@ | @@OLDSPOT3025\_5@@ | @@OLDSPOT3030\_5@@ |
| 25% | @@OLDSPOT301\_25@@ | @@OLDSPOT305\_25@@ | @@OLDSPOT3010\_25@@ | @@OLDSPOT3015\_25@@ | @@OLDSPOT3025\_25@@ | @@OLDSPOT3030\_25@@ |
| 50% | @@OLDSPOT301\_50@@ | @@OLDSPOT305\_50@@ | @@OLDSPOT3010\_50@@ | @@OLDSPOT3015\_50@@ | @@OLDSPOT3025\_50@@ | @@OLDSPOT3030\_50@@ |
| 75% | @@OLDSPOT301\_75@@ | @@OLDSPOT305\_75@@ | @@OLDSPOT3010\_75@@ | @@OLDSPOT3015\_75@@ | @@OLDSPOT3025\_75@@ | @@OLDSPOT3030\_75@@ |
| 95% | @@OLDSPOT301\_95@@ | @@OLDSPOT305\_95@@ | @@OLDSPOT3010\_95@@ | @@OLDSPOT3015\_95@@ | @@OLDSPOT3025\_95@@ | @@OLDSPOT3030\_95@@ |
| Mean | @@OLDSPOT301\_MU@@ | @@OLDSPOT305\_MU@@ | @@OLDSPOT3010\_MU@@ | @@OLDSPOT3015\_MU@@ | @@OLDSPOT3025\_MU@@ | @@OLDSPOT3030\_MU@@ |
| Volatility | @@OLDSPOT301\_VOL@@ | @@OLDSPOT305\_VOL@@ | @@OLDSPOT3010\_VOL@@ | @@OLDSPOT3015\_VOL@@ | @@OLDSPOT3025\_VOL@@ | @@OLDSPOT3030\_VOL@@ |

* + 1. 30yr Continuously Compounded Spot Rate Percentiles (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWSPOT301\_5@@ | @@NEWSPOT305\_5@@ | @@NEWSPOT3010\_5@@ | @@NEWSPOT3015\_5@@ | @@NEWSPOT3025\_5@@ | @@NEWSPOT3030\_5@@ |
| 25% | @@NEWSPOT301\_25@@ | @@NEWSPOT305\_25@@ | @@NEWSPOT3010\_25@@ | @@NEWSPOT3015\_25@@ | @@NEWSPOT3025\_25@@ | @@NEWSPOT3030\_25@@ |
| 50% | @@NEWSPOT301\_50@@ | @@NEWSPOT305\_50@@ | @@NEWSPOT3010\_50@@ | @@NEWSPOT3015\_50@@ | @@NEWSPOT3025\_50@@ | @@NEWSPOT3030\_50@@ |
| 75% | @@NEWSPOT301\_75@@ | @@NEWSPOT305\_75@@ | @@NEWSPOT3010\_75@@ | @@NEWSPOT3015\_75@@ | @@NEWSPOT3025\_75@@ | @@NEWSPOT3030\_75@@ |
| 95% | @@NEWSPOT301\_95@@ | @@NEWSPOT305\_95@@ | @@NEWSPOT3010\_95@@ | @@NEWSPOT3015\_95@@ | @@NEWSPOT3025\_95@@ | @@NEWSPOT3030\_95@@ |
| Mean | @@NEWSPOT301\_MU@@ | @@NEWSPOT305\_MU@@ | @@NEWSPOT3010\_MU@@ | @@NEWSPOT3015\_MU@@ | @@NEWSPOT3025\_MU@@ | @@NEWSPOT3030\_MU@@ |
| Volatility | @@NEWSPOT301\_VOL@@ | @@NEWSPOT305\_VOL@@ | @@NEWSPOT3010\_VOL@@ | @@NEWSPOT3015\_VOL@@ | @@NEWSPOT3025\_VOL@@ | @@NEWSPOT3030\_VOL@@ |

1. Inflation
   1. Introduction
      1. Two different types of inflation are modelled in the standard calibration - Consumer Price Inflation and Average Wage Inflation. Both forms of inflation are modelled using a One Factor Vasicek model (an Ornstein Uhlenbeck process).
      2. The CPI and AWE models are initialised using the Australian Bureau of Statistics (“ABS”) published rates as at the end of the previous quarter. For completeness the 6401.0 and 6345.0 ABS releases are used for CPI and AWE respectively.
      3. The key features of the model are
         * One risk factor
         * Normally distributed short rate model
         * Mean reverting process.
2. Consumer Price Inflation (Vasicek)
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | @@OLDCPIR0@@ | @@NEWCPIR0@@ | The starting rate of the CPI process. |
|  | @@OLDCPIALPHA@@ | @@NEWCPIALPHA@@ | The mean reversion speed of the short rate process. |
|  | @@OLDCPIMU@@ | @@NEWCPIMU@@ | The mean reversion level of the short process |
|  | @@OLDCPISIGMA@@ | @@NEWCPISIGMA@@ | The volatility of the short rate process |
|  | 0 | 0 | The market price of risk of the short rate process. |

* 1. Distributions
     1. CPI Continuously Compounded Annual Rate Percentiles (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDCPI1\_5@@ | @@OLDCPI5\_5@@ | @@OLDCPI10\_5@@ | @@OLDCPI15\_5@@ | @@OLDCPI25\_5@@ | @@OLDCPI30\_5@@ |
| 25% | @@OLDCPI1\_25@@ | @@OLDCPI5\_25@@ | @@OLDCPI10\_25@@ | @@OLDCPI15\_25@@ | @@OLDCPI25\_25@@ | @@OLDCPI30\_25@@ |
| 50% | @@OLDCPI1\_50@@ | @@OLDCPI5\_50@@ | @@OLDCPI10\_50@@ | @@OLDCPI15\_50@@ | @@OLDCPI25\_50@@ | @@OLDCPI30\_50@@ |
| 75% | @@OLDCPI1\_75@@ | @@OLDCPI5\_75@@ | @@OLDCPI10\_75@@ | @@OLDCPI15\_75@@ | @@OLDCPI25\_75@@ | @@OLDCPI30\_75@@ |
| 95% | @@OLDCPI1\_95@@ | @@OLDCPI5\_95@@ | @@OLDCPI10\_95@@ | @@OLDCPI15\_95@@ | @@OLDCPI25\_95@@ | @@OLDCPI30\_95@@ |
| Mean | @@OLDCPI1\_MU@@ | @@OLDCPI5\_MU@@ | @@OLDCPI10\_MU@@ | @@OLDCPI15\_MU@@ | @@OLDCPI25\_MU@@ | @@OLDCPI30\_MU@@ |
| Volatility | @@OLDCPI1\_VOL@@ | @@OLDCPI5\_VOL@@ | @@OLDCPI10\_VOL@@ | @@OLDCPI15\_VOL@@ | @@OLDCPI25\_VOL@@ | @@OLDCPI30\_VOL@@ |

* + 1. CPI Continuously Compounded Annual Rate Percentiles (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWCPI1\_5@@ | @@NEWCPI5\_5@@ | @@NEWCPI10\_5@@ | @@NEWCPI15\_5@@ | @@NEWCPI25\_5@@ | @@NEWCPI30\_5@@ |
| 25% | @@NEWCPI1\_25@@ | @@NEWCPI5\_25@@ | @@NEWCPI10\_25@@ | @@NEWCPI15\_25@@ | @@NEWCPI25\_25@@ | @@NEWCPI30\_25@@ |
| 50% | @@NEWCPI1\_50@@ | @@NEWCPI5\_50@@ | @@NEWCPI10\_50@@ | @@NEWCPI15\_50@@ | @@NEWCPI25\_50@@ | @@NEWCPI30\_50@@ |
| 75% | @@NEWCPI1\_75@@ | @@NEWCPI5\_75@@ | @@NEWCPI10\_75@@ | @@NEWCPI15\_75@@ | @@NEWCPI25\_75@@ | @@NEWCPI30\_75@@ |
| 95% | @@NEWCPI1\_95@@ | @@NEWCPI5\_95@@ | @@NEWCPI10\_95@@ | @@NEWCPI15\_95@@ | @@NEWCPI25\_95@@ | @@NEWCPI30\_95@@ |
| Mean | @@NEWCPI1\_MU@@ | @@NEWCPI5\_MU@@ | @@NEWCPI10\_MU@@ | @@NEWCPI15\_MU@@ | @@NEWCPI25\_MU@@ | @@NEWCPI30\_MU@@ |
| Volatility | @@NEWCPI1\_VOL@@ | @@NEWCPI5\_VOL@@ | @@NEWCPI10\_VOL@@ | @@NEWCPI15\_VOL@@ | @@NEWCPI25\_VOL@@ | @@NEWCPI30\_VOL@@ |

* + 1. CPI Continuously Compounded Annual Rate Charts (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDCPIPERCENTILE@@ | @@OLDCPIHIST@@ |

* + 1. CPI Continuously Compounded Annual Rate Charts (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWCPIPERCENTILE@@ | @@NEWCPIHIST@@ |

1. Average Weekly Earnings (Vasicek)
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | @@OLDAWER0@@ | @@NEWAWER0@@ | The starting rate of the AWE process. |
|  | @@OLDAWEALPHA@@ | @@NEWAWEALPHA@@ | The mean reversion speed of the short rate process. |
|  | @@OLDAWEMU@@ | @@NEWAWEMU@@ | The mean reversion level of the short process |
|  | @@OLDAWESIGMA@@ | @@OLDAWESIGMA@@ | The volatility of the short rate process |
|  | 0 | 0 | The market price of risk of the short rate process. |

* 1. Distributions
     1. AWE Continuously Compounded Annual Rate Percentiles (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAWE1\_5@@ | @@OLDAWE5\_5@@ | @@OLDAWE10\_5@@ | @@OLDAWE15\_5@@ | @@OLDAWE25\_5@@ | @@OLDAWE30\_5@@ |
| 25% | @@OLDAWE1\_25@@ | @@OLDAWE5\_25@@ | @@OLDAWE10\_25@@ | @@OLDAWE15\_25@@ | @@OLDAWE25\_25@@ | @@OLDAWE30\_25@@ |
| 50% | @@OLDAWE1\_50@@ | @@OLDAWE5\_50@@ | @@OLDAWE10\_50@@ | @@OLDAWE15\_50@@ | @@OLDAWE25\_50@@ | @@OLDAWE30\_50@@ |
| 75% | @@OLDAWE1\_75@@ | @@OLDAWE5\_75@@ | @@OLDAWE10\_75@@ | @@OLDAWE15\_75@@ | @@OLDAWE25\_75@@ | @@OLDAWE30\_75@@ |
| 95% | @@OLDAWE1\_95@@ | @@OLDAWE5\_95@@ | @@OLDAWE10\_95@@ | @@OLDAWE15\_95@@ | @@OLDAWE25\_95@@ | @@OLDAWE30\_95@@ |
| Mean | @@OLDAWE1\_MU@@ | @@OLDAWE5\_MU@@ | @@OLDAWE10\_MU@@ | @@OLDAWE15\_MU@@ | @@OLDAWE25\_MU@@ | @@OLDAWE30\_MU@@ |
| Volatility | @@OLDAWE1\_VOL@@ | @@OLDAWE5\_VOL@@ | @@OLDAWE10\_VOL@@ | @@OLDAWE15\_VOL@@ | @@OLDAWE25\_VOL@@ | @@OLDAWE30\_VOL@@ |

* + 1. AWE Continuously Compounded Annual Rate Percentiles (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAWE1\_5@@ | @@NEWAWE5\_5@@ | @@NEWAWE10\_5@@ | @@NEWAWE15\_5@@ | @@NEWAWE25\_5@@ | @@NEWAWE30\_5@@ |
| 25% | @@NEWAWE1\_25@@ | @@NEWAWE5\_25@@ | @@NEWAWE10\_25@@ | @@NEWAWE15\_25@@ | @@NEWAWE25\_25@@ | @@NEWAWE30\_25@@ |
| 50% | @@NEWAWE1\_50@@ | @@NEWAWE5\_50@@ | @@NEWAWE10\_50@@ | @@NEWAWE15\_50@@ | @@NEWAWE25\_50@@ | @@NEWAWE30\_50@@ |
| 75% | @@NEWAWE1\_75@@ | @@NEWAWE5\_75@@ | @@NEWAWE10\_75@@ | @@NEWAWE15\_75@@ | @@NEWAWE25\_75@@ | @@NEWAWE30\_75@@ |
| 95% | @@NEWAWE1\_95@@ | @@NEWAWE5\_95@@ | @@NEWAWE10\_95@@ | @@NEWAWE15\_95@@ | @@NEWAWE25\_95@@ | @@NEWAWE30\_95@@ |
| Mean | @@NEWAWE1\_MU@@ | @@NEWAWE5\_MU@@ | @@NEWAWE10\_MU@@ | @@NEWAWE15\_MU@@ | @@NEWAWE25\_MU@@ | @@NEWAWE30\_MU@@ |
| Volatility | @@NEWAWE1\_VOL@@ | @@NEWAWE5\_VOL@@ | @@NEWAWE10\_VOL@@ | @@NEWAWE15\_VOL@@ | @@NEWAWE25\_VOL@@ | @@NEWAWE30\_VOL@@ |

* + 1. AWE Continuously Compounded Annual Rate Charts (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDAWEPERCENTILE@@ | @@OLDAWEHIST@@ |

* + 1. AWE Continuously Compounded Annual Rate Charts (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWAWEPERCENTILE@@ | @@NEWAWEHIST@@ |

1. Equity Assets
   * 1. Equity assets are modelled using a Geometric Brownian Motion model, a volatility model and an income model. The majority of the assets are configured to use a Regime Switching Volatility model. The income model is used to model a retrospective dividend yield which is then converted into an income return.
     2. The equity assets are modelled as excess returns over the Australian Dollar cash return. The excess return targets and hence parameters are configured periodically, and as such expected returns will change from one calibration to the next due to the change in the initial yield curve. As such this section of the document includes a comparison of the total return distributions of the equity assets between quarters in order to quantify the differences due to the change in the yield curve.
     3. The following equity assets have been calibrated
        + Australian Equities
        + International Equities – Hedged
        + International Equities – Unhedged
        + Emerging Market Equities - Unhedged
2. Australian Equities
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDAUEQP12@@ | @@NEWAUEQP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDAUEQP21@@ | @@NEWAUEQP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDAUEQMU1@@ | @@NEWAUEQMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDAUEQSIGMA1@@ | @@NEWAUEQSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDAUEQMU2@@ | @@NEWAUEQMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDAUEQSIGMA2@@ | @@NEWAUEQSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDAUEQY0@@ | @@NEWAUEQY0@@ | The current retrospective dividend yield. |
|  | @@OLDAUEQYMU@@ | @@NEWAUEQYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDAUEQYALPHA@@ | @@NEWAUEQYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDAUEQYSIGMA@@ | @@NEWAUEQYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDAUEQRHO@@ | @@NEWAUEQRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUEQ1\_5@@ | @@OLDAUEQ5\_5@@ | @@OLDAUEQ10\_5@@ | @@OLDAUEQ15\_5@@ | @@OLDAUEQ25\_5@@ | @@OLDAUEQ30\_5@@ |
| 25% | @@OLDAUEQ1\_25@@ | @@OLDAUEQ5\_25@@ | @@OLDAUEQ10\_25@@ | @@OLDAUEQ15\_25@@ | @@OLDAUEQ25\_25@@ | @@OLDAUEQ30\_25@@ |
| 50% | @@OLDAUEQ1\_50@@ | @@OLDAUEQ5\_50@@ | @@OLDAUEQ10\_50@@ | @@OLDAUEQ15\_50@@ | @@OLDAUEQ25\_50@@ | @@OLDAUEQ30\_50@@ |
| 75% | @@OLDAUEQ1\_75@@ | @@OLDAUEQ5\_75@@ | @@OLDAUEQ10\_75@@ | @@OLDAUEQ15\_75@@ | @@OLDAUEQ25\_75@@ | @@OLDAUEQ30\_75@@ |
| 95% | @@OLDAUEQ1\_95@@ | @@OLDAUEQ5\_95@@ | @@OLDAUEQ10\_95@@ | @@OLDAUEQ15\_95@@ | @@OLDAUEQ25\_95@@ | @@OLDAUEQ30\_95@@ |
| Mean | @@OLDAUEQ1\_MU@@ | @@OLDAUEQ5\_MU@@ | @@OLDAUEQ10\_MU@@ | @@OLDAUEQ15\_MU@@ | @@OLDAUEQ25\_MU@@ | @@OLDAUEQ30\_MU@@ |
| Volatility | @@OLDAUEQ1\_VOL@@ | @@OLDAUEQ5\_VOL@@ | @@OLDAUEQ10\_VOL@@ | @@OLDAUEQ15\_VOL@@ | @@OLDAUEQ25\_VOL@@ | @@OLDAUEQ30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUEQ1\_5@@ | @@NEWAUEQ5\_5@@ | @@NEWAUEQ10\_5@@ | @@NEWAUEQ15\_5@@ | @@NEWAUEQ25\_5@@ | @@NEWAUEQ30\_5@@ |
| 25% | @@NEWAUEQ1\_25@@ | @@NEWAUEQ5\_25@@ | @@NEWAUEQ10\_25@@ | @@NEWAUEQ15\_25@@ | @@NEWAUEQ25\_25@@ | @@NEWAUEQ30\_25@@ |
| 50% | @@NEWAUEQ1\_50@@ | @@NEWAUEQ5\_50@@ | @@NEWAUEQ10\_50@@ | @@NEWAUEQ15\_50@@ | @@NEWAUEQ25\_50@@ | @@NEWAUEQ30\_50@@ |
| 75% | @@NEWAUEQ1\_75@@ | @@NEWAUEQ5\_75@@ | @@NEWAUEQ10\_75@@ | @@NEWAUEQ15\_75@@ | @@NEWAUEQ25\_75@@ | @@NEWAUEQ30\_75@@ |
| 95% | @@NEWAUEQ1\_95@@ | @@NEWAUEQ5\_95@@ | @@NEWAUEQ10\_95@@ | @@NEWAUEQ15\_95@@ | @@NEWAUEQ25\_95@@ | @@NEWAUEQ30\_95@@ |
| Mean | @@NEWAUEQ1\_MU@@ | @@NEWAUEQ5\_MU@@ | @@NEWAUEQ10\_MU@@ | @@NEWAUEQ15\_MU@@ | @@NEWAUEQ25\_MU@@ | @@NEWAUEQ30\_MU@@ |
| Volatility | @@NEWAUEQ1\_VOL@@ | @@NEWAUEQ5\_VOL@@ | @@NEWAUEQ10\_VOL@@ | @@NEWAUEQ15\_VOL@@ | @@NEWAUEQ25\_VOL@@ | @@NEWAUEQ30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDAUEQPERCENTILE@@ | @@OLDAUEQHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWAUEQPERCENTILE@@ | @@NEWAUEQHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUEQIR1\_5@@ | @@OLDAUEQIR5\_5@@ | @@OLDAUEQIR10\_5@@ | @@OLDAUEQIR15\_5@@ | @@OLDAUEQIR25\_5@@ | @@OLDAUEQIR30\_5@@ |
| 25% | @@OLDAUEQIR1\_25@@ | @@OLDAUEQIR5\_25@@ | @@OLDAUEQIR10\_25@@ | @@OLDAUEQIR15\_25@@ | @@OLDAUEQIR25\_25@@ | @@OLDAUEQIR30\_25@@ |
| 50% | @@OLDAUEQIR1\_50@@ | @@OLDAUEQIR5\_50@@ | @@OLDAUEQIR10\_50@@ | @@OLDAUEQIR15\_50@@ | @@OLDAUEQIR25\_50@@ | @@OLDAUEQIR30\_50@@ |
| 75% | @@OLDAUEQIR1\_75@@ | @@OLDAUEQIR5\_75@@ | @@OLDAUEQIR10\_75@@ | @@OLDAUEQIR15\_75@@ | @@OLDAUEQIR25\_75@@ | @@OLDAUEQIR30\_75@@ |
| 95% | @@OLDAUEQIR1\_95@@ | @@OLDAUEQIR5\_95@@ | @@OLDAUEQIR10\_95@@ | @@OLDAUEQIR15\_95@@ | @@OLDAUEQIR25\_95@@ | @@OLDAUEQIR30\_95@@ |
| Mean | @@OLDAUEQIR1\_MU@@ | @@OLDAUEQIR5\_MU@@ | @@OLDAUEQIR10\_MU@@ | @@OLDAUEQIR15\_MU@@ | @@OLDAUEQIR25\_MU@@ | @@OLDAUEQIR30\_MU@@ |
| Volatility | @@OLDAUEQIR1\_VOL@@ | @@OLDAUEQIR5\_VOL@@ | @@OLDAUEQIR10\_VOL@@ | @@OLDAUEQIR15\_VOL@@ | @@OLDAUEQIR25\_VOL@@ | @@OLDAUEQIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUEQIR1\_5@@ | @@NEWAUEQIR5\_5@@ | @@NEWAUEQIR10\_5@@ | @@NEWAUEQIR15\_5@@ | @@NEWAUEQIR25\_5@@ | @@NEWAUEQIR30\_5@@ |
| 25% | @@NEWAUEQIR1\_25@@ | @@NEWAUEQIR5\_25@@ | @@NEWAUEQIR10\_25@@ | @@NEWAUEQIR15\_25@@ | @@NEWAUEQIR25\_25@@ | @@NEWAUEQIR30\_25@@ |
| 50% | @@NEWAUEQIR1\_50@@ | @@NEWAUEQIR5\_50@@ | @@NEWAUEQIR10\_50@@ | @@NEWAUEQIR15\_50@@ | @@NEWAUEQIR25\_50@@ | @@NEWAUEQIR30\_50@@ |
| 75% | @@NEWAUEQIR1\_75@@ | @@NEWAUEQIR5\_75@@ | @@NEWAUEQIR10\_75@@ | @@NEWAUEQIR15\_75@@ | @@NEWAUEQIR25\_75@@ | @@NEWAUEQIR30\_75@@ |
| 95% | @@NEWAUEQIR1\_95@@ | @@NEWAUEQIR5\_95@@ | @@NEWAUEQIR10\_95@@ | @@NEWAUEQIR15\_95@@ | @@NEWAUEQIR25\_95@@ | @@NEWAUEQIR30\_95@@ |
| Mean | @@NEWAUEQIR1\_MU@@ | @@NEWAUEQIR5\_MU@@ | @@NEWAUEQIR10\_MU@@ | @@NEWAUEQIR15\_MU@@ | @@NEWAUEQIR25\_MU@@ | @@NEWAUEQIR30\_MU@@ |
| Volatility | @@NEWAUEQIR1\_VOL@@ | @@NEWAUEQIR5\_VOL@@ | @@NEWAUEQIR10\_VOL@@ | @@NEWAUEQIR15\_VOL@@ | @@NEWAUEQIR25\_VOL@@ | @@NEWAUEQIR30\_VOL@@ |

1. International Equities Hedged
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDINTEQP12@@ | @@NEWINTEQP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDINTEQP21@@ | @@NEWINTEQP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDINTEQMU1@@ | @@NEWINTEQMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDINTEQSIGMA1@@ | @@NEWINTEQSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDINTEQMU2@@ | @@NEWINTEQMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDINTEQSIGMA2@@ | @@NEWINTEQSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDINTEQY0@@ | @@NEWINTEQY0@@ | The current retrospective dividend yield. |
|  | @@OLDINTEQYMU@@ | @@NEWINTEQYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDINTEQYALPHA@@ | @@NEWINTEQYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDINTEQYSIGMA@@ | @@NEWINTEQYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDINTEQRHO@@ | @@NEWINTEQRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTEQ1\_5@@ | @@OLDINTEQ5\_5@@ | @@OLDINTEQ10\_5@@ | @@OLDINTEQ15\_5@@ | @@OLDINTEQ25\_5@@ | @@OLDINTEQ30\_5@@ |
| 25% | @@OLDINTEQ1\_25@@ | @@OLDINTEQ5\_25@@ | @@OLDINTEQ10\_25@@ | @@OLDINTEQ15\_25@@ | @@OLDINTEQ25\_25@@ | @@OLDINTEQ30\_25@@ |
| 50% | @@OLDINTEQ1\_50@@ | @@OLDINTEQ5\_50@@ | @@OLDINTEQ10\_50@@ | @@OLDINTEQ15\_50@@ | @@OLDINTEQ25\_50@@ | @@OLDINTEQ30\_50@@ |
| 75% | @@OLDINTEQ1\_75@@ | @@OLDINTEQ5\_75@@ | @@OLDINTEQ10\_75@@ | @@OLDINTEQ15\_75@@ | @@OLDINTEQ25\_75@@ | @@OLDINTEQ30\_75@@ |
| 95% | @@OLDINTEQ1\_95@@ | @@OLDINTEQ5\_95@@ | @@OLDINTEQ10\_95@@ | @@OLDINTEQ15\_95@@ | @@OLDINTEQ25\_95@@ | @@OLDINTEQ30\_95@@ |
| Mean | @@OLDINTEQ1\_MU@@ | @@OLDINTEQ5\_MU@@ | @@OLDINTEQ10\_MU@@ | @@OLDINTEQ15\_MU@@ | @@OLDINTEQ25\_MU@@ | @@OLDINTEQ30\_MU@@ |
| Volatility | @@OLDINTEQ1\_VOL@@ | @@OLDINTEQ5\_VOL@@ | @@OLDINTEQ10\_VOL@@ | @@OLDINTEQ15\_VOL@@ | @@OLDINTEQ25\_VOL@@ | @@OLDINTEQ30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTEQ1\_5@@ | @@NEWINTEQ5\_5@@ | @@NEWINTEQ10\_5@@ | @@NEWINTEQ15\_5@@ | @@NEWINTEQ25\_5@@ | @@NEWINTEQ30\_5@@ |
| 25% | @@NEWINTEQ1\_25@@ | @@NEWINTEQ5\_25@@ | @@NEWINTEQ10\_25@@ | @@NEWINTEQ15\_25@@ | @@NEWINTEQ25\_25@@ | @@NEWINTEQ30\_25@@ |
| 50% | @@NEWINTEQ1\_50@@ | @@NEWINTEQ5\_50@@ | @@NEWINTEQ10\_50@@ | @@NEWINTEQ15\_50@@ | @@NEWINTEQ25\_50@@ | @@NEWINTEQ30\_50@@ |
| 75% | @@NEWINTEQ1\_75@@ | @@NEWINTEQ5\_75@@ | @@NEWINTEQ10\_75@@ | @@NEWINTEQ15\_75@@ | @@NEWINTEQ25\_75@@ | @@NEWINTEQ30\_75@@ |
| 95% | @@NEWINTEQ1\_95@@ | @@NEWINTEQ5\_95@@ | @@NEWINTEQ10\_95@@ | @@NEWINTEQ15\_95@@ | @@NEWINTEQ25\_95@@ | @@NEWINTEQ30\_95@@ |
| Mean | @@NEWINTEQ1\_MU@@ | @@NEWINTEQ5\_MU@@ | @@NEWINTEQ10\_MU@@ | @@NEWINTEQ15\_MU@@ | @@NEWINTEQ25\_MU@@ | @@NEWINTEQ30\_MU@@ |
| Volatility | @@NEWINTEQ1\_VOL@@ | @@NEWINTEQ5\_VOL@@ | @@NEWINTEQ10\_VOL@@ | @@NEWINTEQ15\_VOL@@ | @@NEWINTEQ25\_VOL@@ | @@NEWINTEQ30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDINTEQPERCENTILE@@ | @@OLDINTEQHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWINTEQPERCENTILE@@ | @@NEWINTEQHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTEQIR1\_5@@ | @@OLDINTEQIR5\_5@@ | @@OLDINTEQIR10\_5@@ | @@OLDINTEQIR15\_5@@ | @@OLDINTEQIR25\_5@@ | @@OLDINTEQIR30\_5@@ |
| 25% | @@OLDINTEQIR1\_25@@ | @@OLDINTEQIR5\_25@@ | @@OLDINTEQIR10\_25@@ | @@OLDINTEQIR15\_25@@ | @@OLDINTEQIR25\_25@@ | @@OLDINTEQIR30\_25@@ |
| 50% | @@OLDINTEQIR1\_50@@ | @@OLDINTEQIR5\_50@@ | @@OLDINTEQIR10\_50@@ | @@OLDINTEQIR15\_50@@ | @@OLDINTEQIR25\_50@@ | @@OLDINTEQIR30\_50@@ |
| 75% | @@OLDINTEQIR1\_75@@ | @@OLDINTEQIR5\_75@@ | @@OLDINTEQIR10\_75@@ | @@OLDINTEQIR15\_75@@ | @@OLDINTEQIR25\_75@@ | @@OLDINTEQIR30\_75@@ |
| 95% | @@OLDINTEQIR1\_95@@ | @@OLDINTEQIR5\_95@@ | @@OLDINTEQIR10\_95@@ | @@OLDINTEQIR15\_95@@ | @@OLDINTEQIR25\_95@@ | @@OLDINTEQIR30\_95@@ |
| Mean | @@OLDINTEQIR1\_MU@@ | @@OLDINTEQIR5\_MU@@ | @@OLDINTEQIR10\_MU@@ | @@OLDINTEQIR15\_MU@@ | @@OLDINTEQIR25\_MU@@ | @@OLDINTEQIR30\_MU@@ |
| Volatility | @@OLDINTEQIR1\_VOL@@ | @@OLDINTEQIR5\_VOL@@ | @@OLDINTEQIR10\_VOL@@ | @@OLDINTEQIR15\_VOL@@ | @@OLDINTEQIR25\_VOL@@ | @@OLDINTEQIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTEQIR1\_5@@ | @@NEWINTEQIR5\_5@@ | @@NEWINTEQIR10\_5@@ | @@NEWINTEQIR15\_5@@ | @@NEWINTEQIR25\_5@@ | @@NEWINTEQIR30\_5@@ |
| 25% | @@NEWINTEQIR1\_25@@ | @@NEWINTEQIR5\_25@@ | @@NEWINTEQIR10\_25@@ | @@NEWINTEQIR15\_25@@ | @@NEWINTEQIR25\_25@@ | @@NEWINTEQIR30\_25@@ |
| 50% | @@NEWINTEQIR1\_50@@ | @@NEWINTEQIR5\_50@@ | @@NEWINTEQIR10\_50@@ | @@NEWINTEQIR15\_50@@ | @@NEWINTEQIR25\_50@@ | @@NEWINTEQIR30\_50@@ |
| 75% | @@NEWINTEQIR1\_75@@ | @@NEWINTEQIR5\_75@@ | @@NEWINTEQIR10\_75@@ | @@NEWINTEQIR15\_75@@ | @@NEWINTEQIR25\_75@@ | @@NEWINTEQIR30\_75@@ |
| 95% | @@NEWINTEQIR1\_95@@ | @@NEWINTEQIR5\_95@@ | @@NEWINTEQIR10\_95@@ | @@NEWINTEQIR15\_95@@ | @@NEWINTEQIR25\_95@@ | @@NEWINTEQIR30\_95@@ |
| Mean | @@NEWINTEQIR1\_MU@@ | @@NEWINTEQIR5\_MU@@ | @@NEWINTEQIR10\_MU@@ | @@NEWINTEQIR15\_MU@@ | @@NEWINTEQIR25\_MU@@ | @@NEWINTEQIR30\_MU@@ |
| Volatility | @@NEWINTEQIR1\_VOL@@ | @@NEWINTEQIR5\_VOL@@ | @@NEWINTEQIR10\_VOL@@ | @@NEWINTEQIR15\_VOL@@ | @@NEWINTEQIR25\_VOL@@ | @@NEWINTEQIR30\_VOL@@ |

1. International Equities Unhedged
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDINTEQUNHP12@@ | @@NEWINTEQUNHP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDINTEQUNHP21@@ | @@NEWINTEQUNHP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDINTEQUNHMU1@@ | @@NEWINTEQUNHMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDINTEQUNHSIGMA1@@ | @@NEWINTEQUNHSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDINTEQUNHMU2@@ | @@NEWINTEQUNHMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDINTEQUNHSIGMA2@@ | @@NEWINTEQUNHSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDINTEQUNHY0@@ | @@NEWINTEQUNHY0@@ | The current retrospective dividend yield. |
|  | @@OLDINTEQUNHYMU@@ | @@NEWINTEQUNHYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDINTEQUNHYALPHA@@ | @@NEWINTEQUNHYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDINTEQUNHYSIGMA@@ | @@NEWINTEQUNHYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDINTEQUNHRHO@@ | @@NEWINTEQUNHRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTEQUNH1\_5@@ | @@OLDINTEQUNH5\_5@@ | @@OLDINTEQUNH10\_5@@ | @@OLDINTEQUNH15\_5@@ | @@OLDINTEQUNH25\_5@@ | @@OLDINTEQUNH30\_5@@ |
| 25% | @@OLDINTEQUNH1\_25@@ | @@OLDINTEQUNH5\_25@@ | @@OLDINTEQUNH10\_25@@ | @@OLDINTEQUNH15\_25@@ | @@OLDINTEQUNH25\_25@@ | @@OLDINTEQUNH30\_25@@ |
| 50% | @@OLDINTEQUNH1\_50@@ | @@OLDINTEQUNH5\_50@@ | @@OLDINTEQUNH10\_50@@ | @@OLDINTEQUNH15\_50@@ | @@OLDINTEQUNH25\_50@@ | @@OLDINTEQUNH30\_50@@ |
| 75% | @@OLDINTEQUNH1\_75@@ | @@OLDINTEQUNH5\_75@@ | @@OLDINTEQUNH10\_75@@ | @@OLDINTEQUNH15\_75@@ | @@OLDINTEQUNH25\_75@@ | @@OLDINTEQUNH30\_75@@ |
| 95% | @@OLDINTEQUNH1\_95@@ | @@OLDINTEQUNH5\_95@@ | @@OLDINTEQUNH10\_95@@ | @@OLDINTEQUNH15\_95@@ | @@OLDINTEQUNH25\_95@@ | @@OLDINTEQUNH30\_95@@ |
| Mean | @@OLDINTEQUNH1\_MU@@ | @@OLDINTEQUNH5\_MU@@ | @@OLDINTEQUNH10\_MU@@ | @@OLDINTEQUNH15\_MU@@ | @@OLDINTEQUNH25\_MU@@ | @@OLDINTEQUNH30\_MU@@ |
| Volatility | @@OLDINTEQUNH1\_VOL@@ | @@OLDINTEQUNH5\_VOL@@ | @@OLDINTEQUNH10\_VOL@@ | @@OLDINTEQUNH15\_VOL@@ | @@OLDINTEQUNH25\_VOL@@ | @@OLDINTEQUNH30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTEQUNH1\_5@@ | @@NEWINTEQUNH5\_5@@ | @@NEWINTEQUNH10\_5@@ | @@NEWINTEQUNH15\_5@@ | @@NEWINTEQUNH25\_5@@ | @@NEWINTEQUNH30\_5@@ |
| 25% | @@NEWINTEQUNH1\_25@@ | @@NEWINTEQUNH5\_25@@ | @@NEWINTEQUNH10\_25@@ | @@NEWINTEQUNH15\_25@@ | @@NEWINTEQUNH25\_25@@ | @@NEWINTEQUNH30\_25@@ |
| 50% | @@NEWINTEQUNH1\_50@@ | @@NEWINTEQUNH5\_50@@ | @@NEWINTEQUNH10\_50@@ | @@NEWINTEQUNH15\_50@@ | @@NEWINTEQUNH25\_50@@ | @@NEWINTEQUNH30\_50@@ |
| 75% | @@NEWINTEQUNH1\_75@@ | @@NEWINTEQUNH5\_75@@ | @@NEWINTEQUNH10\_75@@ | @@NEWINTEQUNH15\_75@@ | @@NEWINTEQUNH25\_75@@ | @@NEWINTEQUNH30\_75@@ |
| 95% | @@NEWINTEQUNH1\_95@@ | @@NEWINTEQUNH5\_95@@ | @@NEWINTEQUNH10\_95@@ | @@NEWINTEQUNH15\_95@@ | @@NEWINTEQUNH25\_95@@ | @@NEWINTEQUNH30\_95@@ |
| Mean | @@NEWINTEQUNH1\_MU@@ | @@NEWINTEQUNH5\_MU@@ | @@NEWINTEQUNH10\_MU@@ | @@NEWINTEQUNH15\_MU@@ | @@NEWINTEQUNH25\_MU@@ | @@NEWINTEQUNH30\_MU@@ |
| Volatility | @@NEWINTEQUNH1\_VOL@@ | @@NEWINTEQUNH5\_VOL@@ | @@NEWINTEQUNH10\_VOL@@ | @@NEWINTEQUNH15\_VOL@@ | @@NEWINTEQUNH25\_VOL@@ | @@NEWINTEQUNH30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDINTEQUNHPERCENTILE@@ | @@OLDINTEQUNHHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWINTEQUNHPERCENTILE@@ | @@NEWINTEQUNHHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTEQUNHIR1\_5@@ | @@OLDINTEQUNHIR5\_5@@ | @@OLDINTEQUNHIR10\_5@@ | @@OLDINTEQUNHIR15\_5@@ | @@OLDINTEQUNHIR25\_5@@ | @@OLDINTEQUNHIR30\_5@@ |
| 25% | @@OLDINTEQUNHIR1\_25@@ | @@OLDINTEQUNHIR5\_25@@ | @@OLDINTEQUNHIR10\_25@@ | @@OLDINTEQUNHIR15\_25@@ | @@OLDINTEQUNHIR25\_25@@ | @@OLDINTEQUNHIR30\_25@@ |
| 50% | @@OLDINTEQUNHIR1\_50@@ | @@OLDINTEQUNHIR5\_50@@ | @@OLDINTEQUNHIR10\_50@@ | @@OLDINTEQUNHIR15\_50@@ | @@OLDINTEQUNHIR25\_50@@ | @@OLDINTEQUNHIR30\_50@@ |
| 75% | @@OLDINTEQUNHIR1\_75@@ | @@OLDINTEQUNHIR5\_75@@ | @@OLDINTEQUNHIR10\_75@@ | @@OLDINTEQUNHIR15\_75@@ | @@OLDINTEQUNHIR25\_75@@ | @@OLDINTEQUNHIR30\_75@@ |
| 95% | @@OLDINTEQUNHIR1\_95@@ | @@OLDINTEQUNHIR5\_95@@ | @@OLDINTEQUNHIR10\_95@@ | @@OLDINTEQUNHIR15\_95@@ | @@OLDINTEQUNHIR25\_95@@ | @@OLDINTEQUNHIR30\_95@@ |
| Mean | @@OLDINTEQUNHIR1\_MU@@ | @@OLDINTEQUNHIR5\_MU@@ | @@OLDINTEQUNHIR10\_MU@@ | @@OLDINTEQUNHIR15\_MU@@ | @@OLDINTEQUNHIR25\_MU@@ | @@OLDINTEQUNHIR30\_MU@@ |
| Volatility | @@OLDINTEQUNHIR1\_VOL@@ | @@OLDINTEQUNHIR5\_VOL@@ | @@OLDINTEQUNHIR10\_VOL@@ | @@OLDINTEQUNHIR15\_VOL@@ | @@OLDINTEQUNHIR25\_VOL@@ | @@OLDINTEQUNHIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTEQUNHIR1\_5@@ | @@NEWINTEQUNHIR5\_5@@ | @@NEWINTEQUNHIR10\_5@@ | @@NEWINTEQUNHIR15\_5@@ | @@NEWINTEQUNHIR25\_5@@ | @@NEWINTEQUNHIR30\_5@@ |
| 25% | @@NEWINTEQUNHIR1\_25@@ | @@NEWINTEQUNHIR5\_25@@ | @@NEWINTEQUNHIR10\_25@@ | @@NEWINTEQUNHIR15\_25@@ | @@NEWINTEQUNHIR25\_25@@ | @@NEWINTEQUNHIR30\_25@@ |
| 50% | @@NEWINTEQUNHIR1\_50@@ | @@NEWINTEQUNHIR5\_50@@ | @@NEWINTEQUNHIR10\_50@@ | @@NEWINTEQUNHIR15\_50@@ | @@NEWINTEQUNHIR25\_50@@ | @@NEWINTEQUNHIR30\_50@@ |
| 75% | @@NEWINTEQUNHIR1\_75@@ | @@NEWINTEQUNHIR5\_75@@ | @@NEWINTEQUNHIR10\_75@@ | @@NEWINTEQUNHIR15\_75@@ | @@NEWINTEQUNHIR25\_75@@ | @@NEWINTEQUNHIR30\_75@@ |
| 95% | @@NEWINTEQUNHIR1\_95@@ | @@NEWINTEQUNHIR5\_95@@ | @@NEWINTEQUNHIR10\_95@@ | @@NEWINTEQUNHIR15\_95@@ | @@NEWINTEQUNHIR25\_95@@ | @@NEWINTEQUNHIR30\_95@@ |
| Mean | @@NEWINTEQUNHIR1\_MU@@ | @@NEWINTEQUNHIR5\_MU@@ | @@NEWINTEQUNHIR10\_MU@@ | @@NEWINTEQUNHIR15\_MU@@ | @@NEWINTEQUNHIR25\_MU@@ | @@NEWINTEQUNHIR30\_MU@@ |
| Volatility | @@NEWINTEQUNHIR1\_VOL@@ | @@NEWINTEQUNHIR5\_VOL@@ | @@NEWINTEQUNHIR10\_VOL@@ | @@NEWINTEQUNHIR15\_VOL@@ | @@NEWINTEQUNHIR25\_VOL@@ | @@NEWINTEQUNHIR30\_VOL@@ |

1. Emerging Market Equities Unhedged
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDEMEQP12@@ | @@NEWEMEQP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDEMEQP21@@ | @@NEWEMEQP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDEMEQMU1@@ | @@NEWEMEQMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDEMEQSIGMA1@@ | @@NEWEMEQSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDEMEQMU2@@ | @@NEWEMEQMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDEMEQSIGMA2@@ | @@NEWEMEQSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDEMEQY0@@ | @@NEWEMEQY0@@ | The current retrospective dividend yield. |
|  | @@OLDEMEQYMU@@ | @@NEWEMEQYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDEMEQYALPHA@@ | @@NEWEMEQYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDEMEQYSIGMA@@ | @@NEWEMEQYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDEMEQRHO@@ | @@NEWEMEQRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDEMEQ1\_5@@ | @@OLDEMEQ5\_5@@ | @@OLDEMEQ10\_5@@ | @@OLDEMEQ15\_5@@ | @@OLDEMEQ25\_5@@ | @@OLDEMEQ30\_5@@ |
| 25% | @@OLDEMEQ1\_25@@ | @@OLDEMEQ5\_25@@ | @@OLDEMEQ10\_25@@ | @@OLDEMEQ15\_25@@ | @@OLDEMEQ25\_25@@ | @@OLDEMEQ30\_25@@ |
| 50% | @@OLDEMEQ1\_50@@ | @@OLDEMEQ5\_50@@ | @@OLDEMEQ10\_50@@ | @@OLDEMEQ15\_50@@ | @@OLDEMEQ25\_50@@ | @@OLDEMEQ30\_50@@ |
| 75% | @@OLDEMEQ1\_75@@ | @@OLDEMEQ5\_75@@ | @@OLDEMEQ10\_75@@ | @@OLDEMEQ15\_75@@ | @@OLDEMEQ25\_75@@ | @@OLDEMEQ30\_75@@ |
| 95% | @@OLDEMEQ1\_95@@ | @@OLDEMEQ5\_95@@ | @@OLDEMEQ10\_95@@ | @@OLDEMEQ15\_95@@ | @@OLDEMEQ25\_95@@ | @@OLDEMEQ30\_95@@ |
| Mean | @@OLDEMEQ1\_MU@@ | @@OLDEMEQ5\_MU@@ | @@OLDEMEQ10\_MU@@ | @@OLDEMEQ15\_MU@@ | @@OLDEMEQ25\_MU@@ | @@OLDEMEQ30\_MU@@ |
| Volatility | @@OLDEMEQ1\_VOL@@ | @@OLDEMEQ5\_VOL@@ | @@OLDEMEQ10\_VOL@@ | @@OLDEMEQ15\_VOL@@ | @@OLDEMEQ25\_VOL@@ | @@OLDEMEQ30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWEMEQ1\_5@@ | @@NEWEMEQ5\_5@@ | @@NEWEMEQ10\_5@@ | @@NEWEMEQ15\_5@@ | @@NEWEMEQ25\_5@@ | @@NEWEMEQ30\_5@@ |
| 25% | @@NEWEMEQ1\_25@@ | @@NEWEMEQ5\_25@@ | @@NEWEMEQ10\_25@@ | @@NEWEMEQ15\_25@@ | @@NEWEMEQ25\_25@@ | @@NEWEMEQ30\_25@@ |
| 50% | @@NEWEMEQ1\_50@@ | @@NEWEMEQ5\_50@@ | @@NEWEMEQ10\_50@@ | @@NEWEMEQ15\_50@@ | @@NEWEMEQ25\_50@@ | @@NEWEMEQ30\_50@@ |
| 75% | @@NEWEMEQ1\_75@@ | @@NEWEMEQ5\_75@@ | @@NEWEMEQ10\_75@@ | @@NEWEMEQ15\_75@@ | @@NEWEMEQ25\_75@@ | @@NEWEMEQ30\_75@@ |
| 95% | @@NEWEMEQ1\_95@@ | @@NEWEMEQ5\_95@@ | @@NEWEMEQ10\_95@@ | @@NEWEMEQ15\_95@@ | @@NEWEMEQ25\_95@@ | @@NEWEMEQ30\_95@@ |
| Mean | @@NEWEMEQ1\_MU@@ | @@NEWEMEQ5\_MU@@ | @@NEWEMEQ10\_MU@@ | @@NEWEMEQ15\_MU@@ | @@NEWEMEQ25\_MU@@ | @@NEWEMEQ30\_MU@@ |
| Volatility | @@NEWEMEQ1\_VOL@@ | @@NEWEMEQ5\_VOL@@ | @@NEWEMEQ10\_VOL@@ | @@NEWEMEQ15\_VOL@@ | @@NEWEMEQ25\_VOL@@ | @@NEWEMEQ30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDEMEQPERCENTILE@@ | @@OLDEMEQHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWEMEQPERCENTILE@@ | @@NEWEMEQHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDEMEQIR1\_5@@ | @@OLDEMEQIR5\_5@@ | @@OLDEMEQIR10\_5@@ | @@OLDEMEQIR15\_5@@ | @@OLDEMEQIR25\_5@@ | @@OLDEMEQIR30\_5@@ |
| 25% | @@OLDEMEQIR1\_25@@ | @@OLDEMEQIR5\_25@@ | @@OLDEMEQIR10\_25@@ | @@OLDEMEQIR15\_25@@ | @@OLDEMEQIR25\_25@@ | @@OLDEMEQIR30\_25@@ |
| 50% | @@OLDEMEQIR1\_50@@ | @@OLDEMEQIR5\_50@@ | @@OLDEMEQIR10\_50@@ | @@OLDEMEQIR15\_50@@ | @@OLDEMEQIR25\_50@@ | @@OLDEMEQIR30\_50@@ |
| 75% | @@OLDEMEQIR1\_75@@ | @@OLDEMEQIR5\_75@@ | @@OLDEMEQIR10\_75@@ | @@OLDEMEQIR15\_75@@ | @@OLDEMEQIR25\_75@@ | @@OLDEMEQIR30\_75@@ |
| 95% | @@OLDEMEQIR1\_95@@ | @@OLDEMEQIR5\_95@@ | @@OLDEMEQIR10\_95@@ | @@OLDEMEQIR15\_95@@ | @@OLDEMEQIR25\_95@@ | @@OLDEMEQIR30\_95@@ |
| Mean | @@OLDEMEQIR1\_MU@@ | @@OLDEMEQIR5\_MU@@ | @@OLDEMEQIR10\_MU@@ | @@OLDEMEQIR15\_MU@@ | @@OLDEMEQIR25\_MU@@ | @@OLDEMEQIR30\_MU@@ |
| Volatility | @@OLDEMEQIR1\_VOL@@ | @@OLDEMEQIR5\_VOL@@ | @@OLDEMEQIR10\_VOL@@ | @@OLDEMEQIR15\_VOL@@ | @@OLDEMEQIR25\_VOL@@ | @@OLDEMEQIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWEMEQIR1\_5@@ | @@NEWEMEQIR5\_5@@ | @@NEWEMEQIR10\_5@@ | @@NEWEMEQIR15\_5@@ | @@NEWEMEQIR25\_5@@ | @@NEWEMEQIR30\_5@@ |
| 25% | @@NEWEMEQIR1\_25@@ | @@NEWEMEQIR5\_25@@ | @@NEWEMEQIR10\_25@@ | @@NEWEMEQIR15\_25@@ | @@NEWEMEQIR25\_25@@ | @@NEWEMEQIR30\_25@@ |
| 50% | @@NEWEMEQIR1\_50@@ | @@NEWEMEQIR5\_50@@ | @@NEWEMEQIR10\_50@@ | @@NEWEMEQIR15\_50@@ | @@NEWEMEQIR25\_50@@ | @@NEWEMEQIR30\_50@@ |
| 75% | @@NEWEMEQIR1\_75@@ | @@NEWEMEQIR5\_75@@ | @@NEWEMEQIR10\_75@@ | @@NEWEMEQIR15\_75@@ | @@NEWEMEQIR25\_75@@ | @@NEWEMEQIR30\_75@@ |
| 95% | @@NEWEMEQIR1\_95@@ | @@NEWEMEQIR5\_95@@ | @@NEWEMEQIR10\_95@@ | @@NEWEMEQIR15\_95@@ | @@NEWEMEQIR25\_95@@ | @@NEWEMEQIR30\_95@@ |
| Mean | @@NEWEMEQIR1\_MU@@ | @@NEWEMEQIR5\_MU@@ | @@NEWEMEQIR10\_MU@@ | @@NEWEMEQIR15\_MU@@ | @@NEWEMEQIR25\_MU@@ | @@NEWEMEQIR30\_MU@@ |
| Volatility | @@NEWEMEQIR1\_VOL@@ | @@NEWEMEQIR5\_VOL@@ | @@NEWEMEQIR10\_VOL@@ | @@NEWEMEQIR15\_VOL@@ | @@NEWEMEQIR25\_VOL@@ | @@NEWEMEQIR30\_VOL@@ |

1. Fixed Income Assets
   1. Overview
      1. Fixed income assets are currently modelled in a similar way to Equity assets using a Geometric Brownian Motion model, a volatility model and an income model. All the fixed income assets are currently configured to use a Regime Switching Volatility model. The income model is used to model a retrospective dividend yield which is then converted into an income return.
      2. The fixed income assets are modelled as excess returns above the Australian Dollar cash return. The excess return targets and hence parameters are configured periodically and as such the total returns quarterly change will be due to the updated yield curve. As such this section of the document will aim to compare the total return distributions of the fixed income assets between quarters in order to quantify the differences due to the change in the yield curve.
      3. The following fixed income assets have been calibrated
         * Australian Fixed Interest Government
         * Australian Fixed Interest Corporate
         * International Fixed Interest Government
2. Australian Fixed Interest Government
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDAUFIP12@@ | @@NEWAUFIP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDAUFIP21@@ | @@NEWAUFIP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDAUFIMU1@@ | @@NEWAUFIMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDAUFISIGMA1@@ | @@NEWAUFISIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDAUFIMU2@@ | @@NEWAUFIMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDAUFISIGMA2@@ | @@NEWAUFISIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDAUFIY0@@ | @@NEWAUFIY0@@ | The current retrospective dividend yield. |
|  | @@OLDAUFIYMU@@ | @@NEWAUFIYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDAUFIYALPHA@@ | @@NEWAUFIYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDAUFIYSIGMA@@ | @@NEWAUFIYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDAUFIRHO@@ | @@NEWAUFIRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUFI1\_5@@ | @@OLDAUFI5\_5@@ | @@OLDAUFI10\_5@@ | @@OLDAUFI15\_5@@ | @@OLDAUFI25\_5@@ | @@OLDAUFI30\_5@@ |
| 25% | @@OLDAUFI1\_25@@ | @@OLDAUFI5\_25@@ | @@OLDAUFI10\_25@@ | @@OLDAUFI15\_25@@ | @@OLDAUFI25\_25@@ | @@OLDAUFI30\_25@@ |
| 50% | @@OLDAUFI1\_50@@ | @@OLDAUFI5\_50@@ | @@OLDAUFI10\_50@@ | @@OLDAUFI15\_50@@ | @@OLDAUFI25\_50@@ | @@OLDAUFI30\_50@@ |
| 75% | @@OLDAUFI1\_75@@ | @@OLDAUFI5\_75@@ | @@OLDAUFI10\_75@@ | @@OLDAUFI15\_75@@ | @@OLDAUFI25\_75@@ | @@OLDAUFI30\_75@@ |
| 95% | @@OLDAUFI1\_95@@ | @@OLDAUFI5\_95@@ | @@OLDAUFI10\_95@@ | @@OLDAUFI15\_95@@ | @@OLDAUFI25\_95@@ | @@OLDAUFI30\_95@@ |
| Mean | @@OLDAUFI1\_MU@@ | @@OLDAUFI5\_MU@@ | @@OLDAUFI10\_MU@@ | @@OLDAUFI15\_MU@@ | @@OLDAUFI25\_MU@@ | @@OLDAUFI30\_MU@@ |
| Volatility | @@OLDAUFI1\_VOL@@ | @@OLDAUFI5\_VOL@@ | @@OLDAUFI10\_VOL@@ | @@OLDAUFI15\_VOL@@ | @@OLDAUFI25\_VOL@@ | @@OLDAUFI30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUFI1\_5@@ | @@NEWAUFI5\_5@@ | @@NEWAUFI10\_5@@ | @@NEWAUFI15\_5@@ | @@NEWAUFI25\_5@@ | @@NEWAUFI30\_5@@ |
| 25% | @@NEWAUFI1\_25@@ | @@NEWAUFI5\_25@@ | @@NEWAUFI10\_25@@ | @@NEWAUFI15\_25@@ | @@NEWAUFI25\_25@@ | @@NEWAUFI30\_25@@ |
| 50% | @@NEWAUFI1\_50@@ | @@NEWAUFI5\_50@@ | @@NEWAUFI10\_50@@ | @@NEWAUFI15\_50@@ | @@NEWAUFI25\_50@@ | @@NEWAUFI30\_50@@ |
| 75% | @@NEWAUFI1\_75@@ | @@NEWAUFI5\_75@@ | @@NEWAUFI10\_75@@ | @@NEWAUFI15\_75@@ | @@NEWAUFI25\_75@@ | @@NEWAUFI30\_75@@ |
| 95% | @@NEWAUFI1\_95@@ | @@NEWAUFI5\_95@@ | @@NEWAUFI10\_95@@ | @@NEWAUFI15\_95@@ | @@NEWAUFI25\_95@@ | @@NEWAUFI30\_95@@ |
| Mean | @@NEWAUFI1\_MU@@ | @@NEWAUFI5\_MU@@ | @@NEWAUFI10\_MU@@ | @@NEWAUFI15\_MU@@ | @@NEWAUFI25\_MU@@ | @@NEWAUFI30\_MU@@ |
| Volatility | @@NEWAUFI1\_VOL@@ | @@NEWAUFI5\_VOL@@ | @@NEWAUFI10\_VOL@@ | @@NEWAUFI15\_VOL@@ | @@NEWAUFI25\_VOL@@ | @@NEWAUFI30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDAUFIPERCENTILE@@ | @@OLDAUFIHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWAUFIPERCENTILE@@ | @@NEWAUFIHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUFIIR1\_5@@ | @@OLDAUFIIR5\_5@@ | @@OLDAUFIIR10\_5@@ | @@OLDAUFIIR15\_5@@ | @@OLDAUFIIR25\_5@@ | @@OLDAUFIIR30\_5@@ |
| 25% | @@OLDAUFIIR1\_25@@ | @@OLDAUFIIR5\_25@@ | @@OLDAUFIIR10\_25@@ | @@OLDAUFIIR15\_25@@ | @@OLDAUFIIR25\_25@@ | @@OLDAUFIIR30\_25@@ |
| 50% | @@OLDAUFIIR1\_50@@ | @@OLDAUFIIR5\_50@@ | @@OLDAUFIIR10\_50@@ | @@OLDAUFIIR15\_50@@ | @@OLDAUFIIR25\_50@@ | @@OLDAUFIIR30\_50@@ |
| 75% | @@OLDAUFIIR1\_75@@ | @@OLDAUFIIR5\_75@@ | @@OLDAUFIIR10\_75@@ | @@OLDAUFIIR15\_75@@ | @@OLDAUFIIR25\_75@@ | @@OLDAUFIIR30\_75@@ |
| 95% | @@OLDAUFIIR1\_95@@ | @@OLDAUFIIR5\_95@@ | @@OLDAUFIIR10\_95@@ | @@OLDAUFIIR15\_95@@ | @@OLDAUFIIR25\_95@@ | @@OLDAUFIIR30\_95@@ |
| Mean | @@OLDAUFIIR1\_MU@@ | @@OLDAUFIIR5\_MU@@ | @@OLDAUFIIR10\_MU@@ | @@OLDAUFIIR15\_MU@@ | @@OLDAUFIIR25\_MU@@ | @@OLDAUFIIR30\_MU@@ |
| Volatility | @@OLDAUFIIR1\_VOL@@ | @@OLDAUFIIR5\_VOL@@ | @@OLDAUFIIR10\_VOL@@ | @@OLDAUFIIR15\_VOL@@ | @@OLDAUFIIR25\_VOL@@ | @@OLDAUFIIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUFIIR1\_5@@ | @@NEWAUFIIR5\_5@@ | @@NEWAUFIIR10\_5@@ | @@NEWAUFIIR15\_5@@ | @@NEWAUFIIR25\_5@@ | @@NEWAUFIIR30\_5@@ |
| 25% | @@NEWAUFIIR1\_25@@ | @@NEWAUFIIR5\_25@@ | @@NEWAUFIIR10\_25@@ | @@NEWAUFIIR15\_25@@ | @@NEWAUFIIR25\_25@@ | @@NEWAUFIIR30\_25@@ |
| 50% | @@NEWAUFIIR1\_50@@ | @@NEWAUFIIR5\_50@@ | @@NEWAUFIIR10\_50@@ | @@NEWAUFIIR15\_50@@ | @@NEWAUFIIR25\_50@@ | @@NEWAUFIIR30\_50@@ |
| 75% | @@NEWAUFIIR1\_75@@ | @@NEWAUFIIR5\_75@@ | @@NEWAUFIIR10\_75@@ | @@NEWAUFIIR15\_75@@ | @@NEWAUFIIR25\_75@@ | @@NEWAUFIIR30\_75@@ |
| 95% | @@NEWAUFIIR1\_95@@ | @@NEWAUFIIR5\_95@@ | @@NEWAUFIIR10\_95@@ | @@NEWAUFIIR15\_95@@ | @@NEWAUFIIR25\_95@@ | @@NEWAUFIIR30\_95@@ |
| Mean | @@NEWAUFIIR1\_MU@@ | @@NEWAUFIIR5\_MU@@ | @@NEWAUFIIR10\_MU@@ | @@NEWAUFIIR15\_MU@@ | @@NEWAUFIIR25\_MU@@ | @@NEWAUFIIR30\_MU@@ |
| Volatility | @@NEWAUFIIR1\_VOL@@ | @@NEWAUFIIR5\_VOL@@ | @@NEWAUFIIR10\_VOL@@ | @@NEWAUFIIR15\_VOL@@ | @@NEWAUFIIR25\_VOL@@ | @@NEWAUFIIR30\_VOL@@ |

1. Australian Fixed Interest Corporate
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDAUFICP12@@ | @@NEWAUFICP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDAUFICP21@@ | @@NEWAUFICP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDAUFICMU1@@ | @@NEWAUFICMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDAUFICSIGMA1@@ | @@NEWAUFICSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDAUFICMU2@@ | @@NEWAUFICMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDAUFICSIGMA2@@ | @@NEWAUFICSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDAUFICY0@@ | @@NEWAUFICY0@@ | The current retrospective dividend yield. |
|  | @@OLDAUFICYMU@@ | @@NEWAUFICYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDAUFICYALPHA@@ | @@NEWAUFICYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDAUFICYSIGMA@@ | @@NEWAUFICYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDAUFICRHO@@ | @@NEWAUFICRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUFIC1\_5@@ | @@OLDAUFIC5\_5@@ | @@OLDAUFIC10\_5@@ | @@OLDAUFIC15\_5@@ | @@OLDAUFIC25\_5@@ | @@OLDAUFIC30\_5@@ |
| 25% | @@OLDAUFIC1\_25@@ | @@OLDAUFIC5\_25@@ | @@OLDAUFIC10\_25@@ | @@OLDAUFIC15\_25@@ | @@OLDAUFIC25\_25@@ | @@OLDAUFIC30\_25@@ |
| 50% | @@OLDAUFIC1\_50@@ | @@OLDAUFIC5\_50@@ | @@OLDAUFIC10\_50@@ | @@OLDAUFIC15\_50@@ | @@OLDAUFIC25\_50@@ | @@OLDAUFIC30\_50@@ |
| 75% | @@OLDAUFIC1\_75@@ | @@OLDAUFIC5\_75@@ | @@OLDAUFIC10\_75@@ | @@OLDAUFIC15\_75@@ | @@OLDAUFIC25\_75@@ | @@OLDAUFIC30\_75@@ |
| 95% | @@OLDAUFIC1\_95@@ | @@OLDAUFIC5\_95@@ | @@OLDAUFIC10\_95@@ | @@OLDAUFIC15\_95@@ | @@OLDAUFIC25\_95@@ | @@OLDAUFIC30\_95@@ |
| Mean | @@OLDAUFIC1\_MU@@ | @@OLDAUFIC5\_MU@@ | @@OLDAUFIC10\_MU@@ | @@OLDAUFIC15\_MU@@ | @@OLDAUFIC25\_MU@@ | @@OLDAUFIC30\_MU@@ |
| Volatility | @@OLDAUFIC1\_VOL@@ | @@OLDAUFIC5\_VOL@@ | @@OLDAUFIC10\_VOL@@ | @@OLDAUFIC15\_VOL@@ | @@OLDAUFIC25\_VOL@@ | @@OLDAUFIC30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUFIC1\_5@@ | @@NEWAUFIC5\_5@@ | @@NEWAUFIC10\_5@@ | @@NEWAUFIC15\_5@@ | @@NEWAUFIC25\_5@@ | @@NEWAUFIC30\_5@@ |
| 25% | @@NEWAUFIC1\_25@@ | @@NEWAUFIC5\_25@@ | @@NEWAUFIC10\_25@@ | @@NEWAUFIC15\_25@@ | @@NEWAUFIC25\_25@@ | @@NEWAUFIC30\_25@@ |
| 50% | @@NEWAUFIC1\_50@@ | @@NEWAUFIC5\_50@@ | @@NEWAUFIC10\_50@@ | @@NEWAUFIC15\_50@@ | @@NEWAUFIC25\_50@@ | @@NEWAUFIC30\_50@@ |
| 75% | @@NEWAUFIC1\_75@@ | @@NEWAUFIC5\_75@@ | @@NEWAUFIC10\_75@@ | @@NEWAUFIC15\_75@@ | @@NEWAUFIC25\_75@@ | @@NEWAUFIC30\_75@@ |
| 95% | @@NEWAUFIC1\_95@@ | @@NEWAUFIC5\_95@@ | @@NEWAUFIC10\_95@@ | @@NEWAUFIC15\_95@@ | @@NEWAUFIC25\_95@@ | @@NEWAUFIC30\_95@@ |
| Mean | @@NEWAUFIC1\_MU@@ | @@NEWAUFIC5\_MU@@ | @@NEWAUFIC10\_MU@@ | @@NEWAUFIC15\_MU@@ | @@NEWAUFIC25\_MU@@ | @@NEWAUFIC30\_MU@@ |
| Volatility | @@NEWAUFIC1\_VOL@@ | @@NEWAUFIC5\_VOL@@ | @@NEWAUFIC10\_VOL@@ | @@NEWAUFIC15\_VOL@@ | @@NEWAUFIC25\_VOL@@ | @@NEWAUFIC30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDAUFICPERCENTILE@@ | @@OLDAUFICHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWAUFICPERCENTILE@@ | @@NEWAUFICHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUFICIR1\_5@@ | @@OLDAUFICIR5\_5@@ | @@OLDAUFICIR10\_5@@ | @@OLDAUFICIR15\_5@@ | @@OLDAUFICIR25\_5@@ | @@OLDAUFICIR30\_5@@ |
| 25% | @@OLDAUFICIR1\_25@@ | @@OLDAUFICIR5\_25@@ | @@OLDAUFICIR10\_25@@ | @@OLDAUFICIR15\_25@@ | @@OLDAUFICIR25\_25@@ | @@OLDAUFICIR30\_25@@ |
| 50% | @@OLDAUFICIR1\_50@@ | @@OLDAUFICIR5\_50@@ | @@OLDAUFICIR10\_50@@ | @@OLDAUFICIR15\_50@@ | @@OLDAUFICIR25\_50@@ | @@OLDAUFICIR30\_50@@ |
| 75% | @@OLDAUFICIR1\_75@@ | @@OLDAUFICIR5\_75@@ | @@OLDAUFICIR10\_75@@ | @@OLDAUFICIR15\_75@@ | @@OLDAUFICIR25\_75@@ | @@OLDAUFICIR30\_75@@ |
| 95% | @@OLDAUFICIR1\_95@@ | @@OLDAUFICIR5\_95@@ | @@OLDAUFICIR10\_95@@ | @@OLDAUFICIR15\_95@@ | @@OLDAUFICIR25\_95@@ | @@OLDAUFICIR30\_95@@ |
| Mean | @@OLDAUFICIR1\_MU@@ | @@OLDAUFICIR5\_MU@@ | @@OLDAUFICIR10\_MU@@ | @@OLDAUFICIR15\_MU@@ | @@OLDAUFICIR25\_MU@@ | @@OLDAUFICIR30\_MU@@ |
| Volatility | @@OLDAUFICIR1\_VOL@@ | @@OLDAUFICIR5\_VOL@@ | @@OLDAUFICIR10\_VOL@@ | @@OLDAUFICIR15\_VOL@@ | @@OLDAUFICIR25\_VOL@@ | @@OLDAUFICIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUFICIR1\_5@@ | @@NEWAUFICIR5\_5@@ | @@NEWAUFICIR10\_5@@ | @@NEWAUFICIR15\_5@@ | @@NEWAUFICIR25\_5@@ | @@NEWAUFICIR30\_5@@ |
| 25% | @@NEWAUFICIR1\_25@@ | @@NEWAUFICIR5\_25@@ | @@NEWAUFICIR10\_25@@ | @@NEWAUFICIR15\_25@@ | @@NEWAUFICIR25\_25@@ | @@NEWAUFICIR30\_25@@ |
| 50% | @@NEWAUFICIR1\_50@@ | @@NEWAUFICIR5\_50@@ | @@NEWAUFICIR10\_50@@ | @@NEWAUFICIR15\_50@@ | @@NEWAUFICIR25\_50@@ | @@NEWAUFICIR30\_50@@ |
| 75% | @@NEWAUFICIR1\_75@@ | @@NEWAUFICIR5\_75@@ | @@NEWAUFICIR10\_75@@ | @@NEWAUFICIR15\_75@@ | @@NEWAUFICIR25\_75@@ | @@NEWAUFICIR30\_75@@ |
| 95% | @@NEWAUFICIR1\_95@@ | @@NEWAUFICIR5\_95@@ | @@NEWAUFICIR10\_95@@ | @@NEWAUFICIR15\_95@@ | @@NEWAUFICIR25\_95@@ | @@NEWAUFICIR30\_95@@ |
| Mean | @@NEWAUFICIR1\_MU@@ | @@NEWAUFICIR5\_MU@@ | @@NEWAUFICIR10\_MU@@ | @@NEWAUFICIR15\_MU@@ | @@NEWAUFICIR25\_MU@@ | @@NEWAUFICIR30\_MU@@ |
| Volatility | @@NEWAUFICIR1\_VOL@@ | @@NEWAUFICIR5\_VOL@@ | @@NEWAUFICIR10\_VOL@@ | @@NEWAUFICIR15\_VOL@@ | @@NEWAUFICIR25\_VOL@@ | @@NEWAUFICIR30\_VOL@@ |

1. International Fixed Interest Govt Hedged
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDINTFIP12@@ | @@NEWINTFIP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDINTFIP21@@ | @@NEWINTFIP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDINTFIMU1@@ | @@NEWINTFIMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDINTFISIGMA1@@ | @@NEWINTFISIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDINTFIMU2@@ | @@NEWINTFIMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDINTFISIGMA2@@ | @@NEWINTFISIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDINTFIY0@@ | @@NEWINTFIY0@@ | The current retrospective dividend yield. |
|  | @@OLDINTFIYMU@@ | @@NEWINTFIYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDINTFIYALPHA@@ | @@NEWINTFIYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDINTFIYSIGMA@@ | @@NEWINTFIYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDINTFIRHO@@ | @@NEWINTFIRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTFI1\_5@@ | @@OLDINTFI5\_5@@ | @@OLDINTFI10\_5@@ | @@OLDINTFI15\_5@@ | @@OLDINTFI25\_5@@ | @@OLDINTFI30\_5@@ |
| 25% | @@OLDINTFI1\_25@@ | @@OLDINTFI5\_25@@ | @@OLDINTFI10\_25@@ | @@OLDINTFI15\_25@@ | @@OLDINTFI25\_25@@ | @@OLDINTFI30\_25@@ |
| 50% | @@OLDINTFI1\_50@@ | @@OLDINTFI5\_50@@ | @@OLDINTFI10\_50@@ | @@OLDINTFI15\_50@@ | @@OLDINTFI25\_50@@ | @@OLDINTFI30\_50@@ |
| 75% | @@OLDINTFI1\_75@@ | @@OLDINTFI5\_75@@ | @@OLDINTFI10\_75@@ | @@OLDINTFI15\_75@@ | @@OLDINTFI25\_75@@ | @@OLDINTFI30\_75@@ |
| 95% | @@OLDINTFI1\_95@@ | @@OLDINTFI5\_95@@ | @@OLDINTFI10\_95@@ | @@OLDINTFI15\_95@@ | @@OLDINTFI25\_95@@ | @@OLDINTFI30\_95@@ |
| Mean | @@OLDINTFI1\_MU@@ | @@OLDINTFI5\_MU@@ | @@OLDINTFI10\_MU@@ | @@OLDINTFI15\_MU@@ | @@OLDINTFI25\_MU@@ | @@OLDINTFI30\_MU@@ |
| Volatility | @@OLDINTFI1\_VOL@@ | @@OLDINTFI5\_VOL@@ | @@OLDINTFI10\_VOL@@ | @@OLDINTFI15\_VOL@@ | @@OLDINTFI25\_VOL@@ | @@OLDINTFI30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTFI1\_5@@ | @@NEWINTFI5\_5@@ | @@NEWINTFI10\_5@@ | @@NEWINTFI15\_5@@ | @@NEWINTFI25\_5@@ | @@NEWINTFI30\_5@@ |
| 25% | @@NEWINTFI1\_25@@ | @@NEWINTFI5\_25@@ | @@NEWINTFI10\_25@@ | @@NEWINTFI15\_25@@ | @@NEWINTFI25\_25@@ | @@NEWINTFI30\_25@@ |
| 50% | @@NEWINTFI1\_50@@ | @@NEWINTFI5\_50@@ | @@NEWINTFI10\_50@@ | @@NEWINTFI15\_50@@ | @@NEWINTFI25\_50@@ | @@NEWINTFI30\_50@@ |
| 75% | @@NEWINTFI1\_75@@ | @@NEWINTFI5\_75@@ | @@NEWINTFI10\_75@@ | @@NEWINTFI15\_75@@ | @@NEWINTFI25\_75@@ | @@NEWINTFI30\_75@@ |
| 95% | @@NEWINTFI1\_95@@ | @@NEWINTFI5\_95@@ | @@NEWINTFI10\_95@@ | @@NEWINTFI15\_95@@ | @@NEWINTFI25\_95@@ | @@NEWINTFI30\_95@@ |
| Mean | @@NEWINTFI1\_MU@@ | @@NEWINTFI5\_MU@@ | @@NEWINTFI10\_MU@@ | @@NEWINTFI15\_MU@@ | @@NEWINTFI25\_MU@@ | @@NEWINTFI30\_MU@@ |
| Volatility | @@NEWINTFI1\_VOL@@ | @@NEWINTFI5\_VOL@@ | @@NEWINTFI10\_VOL@@ | @@NEWINTFI15\_VOL@@ | @@NEWINTFI25\_VOL@@ | @@NEWINTFI30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDINTFIPERCENTILE@@ | @@OLDINTFIHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWINTFIPERCENTILE@@ | @@NEWINTFIHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTFIIR1\_5@@ | @@OLDINTFIIR5\_5@@ | @@OLDINTFIIR10\_5@@ | @@OLDINTFIIR15\_5@@ | @@OLDINTFIIR25\_5@@ | @@OLDINTFIIR30\_5@@ |
| 25% | @@OLDINTFIIR1\_25@@ | @@OLDINTFIIR5\_25@@ | @@OLDINTFIIR10\_25@@ | @@OLDINTFIIR15\_25@@ | @@OLDINTFIIR25\_25@@ | @@OLDINTFIIR30\_25@@ |
| 50% | @@OLDINTFIIR1\_50@@ | @@OLDINTFIIR5\_50@@ | @@OLDINTFIIR10\_50@@ | @@OLDINTFIIR15\_50@@ | @@OLDINTFIIR25\_50@@ | @@OLDINTFIIR30\_50@@ |
| 75% | @@OLDINTFIIR1\_75@@ | @@OLDINTFIIR5\_75@@ | @@OLDINTFIIR10\_75@@ | @@OLDINTFIIR15\_75@@ | @@OLDINTFIIR25\_75@@ | @@OLDINTFIIR30\_75@@ |
| 95% | @@OLDINTFIIR1\_95@@ | @@OLDINTFIIR5\_95@@ | @@OLDINTFIIR10\_95@@ | @@OLDINTFIIR15\_95@@ | @@OLDINTFIIR25\_95@@ | @@OLDINTFIIR30\_95@@ |
| Mean | @@OLDINTFIIR1\_MU@@ | @@OLDINTFIIR5\_MU@@ | @@OLDINTFIIR10\_MU@@ | @@OLDINTFIIR15\_MU@@ | @@OLDINTFIIR25\_MU@@ | @@OLDINTFIIR30\_MU@@ |
| Volatility | @@OLDINTFIIR1\_VOL@@ | @@OLDINTFIIR5\_VOL@@ | @@OLDINTFIIR10\_VOL@@ | @@OLDINTFIIR15\_VOL@@ | @@OLDINTFIIR25\_VOL@@ | @@OLDINTFIIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTFIIR1\_5@@ | @@NEWINTFIIR5\_5@@ | @@NEWINTFIIR10\_5@@ | @@NEWINTFIIR15\_5@@ | @@NEWINTFIIR25\_5@@ | @@NEWINTFIIR30\_5@@ |
| 25% | @@NEWINTFIIR1\_25@@ | @@NEWINTFIIR5\_25@@ | @@NEWINTFIIR10\_25@@ | @@NEWINTFIIR15\_25@@ | @@NEWINTFIIR25\_25@@ | @@NEWINTFIIR30\_25@@ |
| 50% | @@NEWINTFIIR1\_50@@ | @@NEWINTFIIR5\_50@@ | @@NEWINTFIIR10\_50@@ | @@NEWINTFIIR15\_50@@ | @@NEWINTFIIR25\_50@@ | @@NEWINTFIIR30\_50@@ |
| 75% | @@NEWINTFIIR1\_75@@ | @@NEWINTFIIR5\_75@@ | @@NEWINTFIIR10\_75@@ | @@NEWINTFIIR15\_75@@ | @@NEWINTFIIR25\_75@@ | @@NEWINTFIIR30\_75@@ |
| 95% | @@NEWINTFIIR1\_95@@ | @@NEWINTFIIR5\_95@@ | @@NEWINTFIIR10\_95@@ | @@NEWINTFIIR15\_95@@ | @@NEWINTFIIR25\_95@@ | @@NEWINTFIIR30\_95@@ |
| Mean | @@NEWINTFIIR1\_MU@@ | @@NEWINTFIIR5\_MU@@ | @@NEWINTFIIR10\_MU@@ | @@NEWINTFIIR15\_MU@@ | @@NEWINTFIIR25\_MU@@ | @@NEWINTFIIR30\_MU@@ |
| Volatility | @@NEWINTFIIR1\_VOL@@ | @@NEWINTFIIR5\_VOL@@ | @@NEWINTFIIR10\_VOL@@ | @@NEWINTFIIR15\_VOL@@ | @@NEWINTFIIR25\_VOL@@ | @@NEWINTFIIR30\_VOL@@ |

1. Other Assets
   1. Overview
      1. Other assets are modelled similarly to Equity assets using a Geometric Brownian Motion model, a volatility model and an income model. All the other assets are configured to use a Regime Switching Volatility model. The income model is used to model a retrospective dividend yield which is then converted into an income return.
      2. The other assets are modelled as excess returns above the Australian Dollar cash return. The excess return targets and hence parameters are configured periodically and as such the total returns quarterly change will be due to the updated yield curve. As such this section of the document will aim to compare the total return distributions of the alternative assets between quarters in order to quantify the differences due to the change in the yield curve.
      3. The following other assets have been calibrated
         * Australian Listed Property
         * Australian Direct Property
         * International Alternatives Hedged
         * Australian Infrastructure
2. Australian Listed Property
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDAUPP12@@ | @@NEWAUPP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDAUPP21@@ | @@NEWAUPP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDAUPMU1@@ | @@NEWAUPMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDAUPSIGMA1@@ | @@NEWAUPSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDAUPMU2@@ | @@NEWAUPMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDAUPSIGMA2@@ | @@NEWAUPSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDAUPY0@@ | @@NEWAUPY0@@ | The current retrospective dividend yield. |
|  | @@OLDAUPYMU@@ | @@NEWAUPYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDAUPYALPHA@@ | @@NEWAUPYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDAUPYSIGMA@@ | @@NEWAUPYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDAUPRHO@@ | @@NEWAUPRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUP1\_5@@ | @@OLDAUP5\_5@@ | @@OLDAUP10\_5@@ | @@OLDAUP15\_5@@ | @@OLDAUP25\_5@@ | @@OLDAUP30\_5@@ |
| 25% | @@OLDAUP1\_25@@ | @@OLDAUP5\_25@@ | @@OLDAUP10\_25@@ | @@OLDAUP15\_25@@ | @@OLDAUP25\_25@@ | @@OLDAUP30\_25@@ |
| 50% | @@OLDAUP1\_50@@ | @@OLDAUP5\_50@@ | @@OLDAUP10\_50@@ | @@OLDAUP15\_50@@ | @@OLDAUP25\_50@@ | @@OLDAUP30\_50@@ |
| 75% | @@OLDAUP1\_75@@ | @@OLDAUP5\_75@@ | @@OLDAUP10\_75@@ | @@OLDAUP15\_75@@ | @@OLDAUP25\_75@@ | @@OLDAUP30\_75@@ |
| 95% | @@OLDAUP1\_95@@ | @@OLDAUP5\_95@@ | @@OLDAUP10\_95@@ | @@OLDAUP15\_95@@ | @@OLDAUP25\_95@@ | @@OLDAUP30\_95@@ |
| Mean | @@OLDAUP1\_MU@@ | @@OLDAUP5\_MU@@ | @@OLDAUP10\_MU@@ | @@OLDAUP15\_MU@@ | @@OLDAUP25\_MU@@ | @@OLDAUP30\_MU@@ |
| Volatility | @@OLDAUP1\_VOL@@ | @@OLDAUP5\_VOL@@ | @@OLDAUP10\_VOL@@ | @@OLDAUP15\_VOL@@ | @@OLDAUP25\_VOL@@ | @@OLDAUP30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUP1\_5@@ | @@NEWAUP5\_5@@ | @@NEWAUP10\_5@@ | @@NEWAUP15\_5@@ | @@NEWAUP25\_5@@ | @@NEWAUP30\_5@@ |
| 25% | @@NEWAUP1\_25@@ | @@NEWAUP5\_25@@ | @@NEWAUP10\_25@@ | @@NEWAUP15\_25@@ | @@NEWAUP25\_25@@ | @@NEWAUP30\_25@@ |
| 50% | @@NEWAUP1\_50@@ | @@NEWAUP5\_50@@ | @@NEWAUP10\_50@@ | @@NEWAUP15\_50@@ | @@NEWAUP25\_50@@ | @@NEWAUP30\_50@@ |
| 75% | @@NEWAUP1\_75@@ | @@NEWAUP5\_75@@ | @@NEWAUP10\_75@@ | @@NEWAUP15\_75@@ | @@NEWAUP25\_75@@ | @@NEWAUP30\_75@@ |
| 95% | @@NEWAUP1\_95@@ | @@NEWAUP5\_95@@ | @@NEWAUP10\_95@@ | @@NEWAUP15\_95@@ | @@NEWAUP25\_95@@ | @@NEWAUP30\_95@@ |
| Mean | @@NEWAUP1\_MU@@ | @@NEWAUP5\_MU@@ | @@NEWAUP10\_MU@@ | @@NEWAUP15\_MU@@ | @@NEWAUP25\_MU@@ | @@NEWAUP30\_MU@@ |
| Volatility | @@NEWAUP1\_VOL@@ | @@NEWAUP5\_VOL@@ | @@NEWAUP10\_VOL@@ | @@NEWAUP15\_VOL@@ | @@NEWAUP25\_VOL@@ | @@NEWAUP30\_VOL@@ |

* + 1. Total Return – Annually Compounded 1 Year Returns Charts (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDAUPPERCENTILE@@ | @@OLDAUPHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWAUPPERCENTILE@@ | @@NEWAUPHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUPIR1\_5@@ | @@OLDAUPIR5\_5@@ | @@OLDAUPIR10\_5@@ | @@OLDAUPIR15\_5@@ | @@OLDAUPIR25\_5@@ | @@OLDAUPIR30\_5@@ |
| 25% | @@OLDAUPIR1\_25@@ | @@OLDAUPIR5\_25@@ | @@OLDAUPIR10\_25@@ | @@OLDAUPIR15\_25@@ | @@OLDAUPIR25\_25@@ | @@OLDAUPIR30\_25@@ |
| 50% | @@OLDAUPIR1\_50@@ | @@OLDAUPIR5\_50@@ | @@OLDAUPIR10\_50@@ | @@OLDAUPIR15\_50@@ | @@OLDAUPIR25\_50@@ | @@OLDAUPIR30\_50@@ |
| 75% | @@OLDAUPIR1\_75@@ | @@OLDAUPIR5\_75@@ | @@OLDAUPIR10\_75@@ | @@OLDAUPIR15\_75@@ | @@OLDAUPIR25\_75@@ | @@OLDAUPIR30\_75@@ |
| 95% | @@OLDAUPIR1\_95@@ | @@OLDAUPIR5\_95@@ | @@OLDAUPIR10\_95@@ | @@OLDAUPIR15\_95@@ | @@OLDAUPIR25\_95@@ | @@OLDAUPIR30\_95@@ |
| Mean | @@OLDAUPIR1\_MU@@ | @@OLDAUPIR5\_MU@@ | @@OLDAUPIR10\_MU@@ | @@OLDAUPIR15\_MU@@ | @@OLDAUPIR25\_MU@@ | @@OLDAUPIR30\_MU@@ |
| Volatility | @@OLDAUPIR1\_VOL@@ | @@OLDAUPIR5\_VOL@@ | @@OLDAUPIR10\_VOL@@ | @@OLDAUPIR15\_VOL@@ | @@OLDAUPIR25\_VOL@@ | @@OLDAUPIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUPIR1\_5@@ | @@NEWAUPIR5\_5@@ | @@NEWAUPIR10\_5@@ | @@NEWAUPIR15\_5@@ | @@NEWAUPIR25\_5@@ | @@NEWAUPIR30\_5@@ |
| 25% | @@NEWAUPIR1\_25@@ | @@NEWAUPIR5\_25@@ | @@NEWAUPIR10\_25@@ | @@NEWAUPIR15\_25@@ | @@NEWAUPIR25\_25@@ | @@NEWAUPIR30\_25@@ |
| 50% | @@NEWAUPIR1\_50@@ | @@NEWAUPIR5\_50@@ | @@NEWAUPIR10\_50@@ | @@NEWAUPIR15\_50@@ | @@NEWAUPIR25\_50@@ | @@NEWAUPIR30\_50@@ |
| 75% | @@NEWAUPIR1\_75@@ | @@NEWAUPIR5\_75@@ | @@NEWAUPIR10\_75@@ | @@NEWAUPIR15\_75@@ | @@NEWAUPIR25\_75@@ | @@NEWAUPIR30\_75@@ |
| 95% | @@NEWAUPIR1\_95@@ | @@NEWAUPIR5\_95@@ | @@NEWAUPIR10\_95@@ | @@NEWAUPIR15\_95@@ | @@NEWAUPIR25\_95@@ | @@NEWAUPIR30\_95@@ |
| Mean | @@NEWAUPIR1\_MU@@ | @@NEWAUPIR5\_MU@@ | @@NEWAUPIR10\_MU@@ | @@NEWAUPIR15\_MU@@ | @@NEWAUPIR25\_MU@@ | @@NEWAUPIR30\_MU@@ |
| Volatility | @@NEWAUPIR1\_VOL@@ | @@NEWAUPIR5\_VOL@@ | @@NEWAUPIR10\_VOL@@ | @@NEWAUPIR15\_VOL@@ | @@NEWAUPIR25\_VOL@@ | @@NEWAUPIR30\_VOL@@ |

1. Australian Direct Property
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDAUDPP12@@ | @@NEWAUDPP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDAUDPP21@@ | @@NEWAUDPP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDAUDPMU1@@ | @@NEWAUDPMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDAUDPSIGMA1@@ | @@NEWAUDPSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDAUDPMU2@@ | @@NEWAUDPMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDAUDPSIGMA2@@ | @@NEWAUDPSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDAUDPY0@@ | @@NEWAUDPY0@@ | The current retrospective dividend yield. |
|  | @@OLDAUDPYMU@@ | @@NEWAUDPYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDAUDPYALPHA@@ | @@NEWAUDPYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDAUDPYSIGMA@@ | @@NEWAUDPYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDAUDPRHO@@ | @@NEWAUDPRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUDP1\_5@@ | @@OLDAUDP5\_5@@ | @@OLDAUDP10\_5@@ | @@OLDAUDP15\_5@@ | @@OLDAUDP25\_5@@ | @@OLDAUDP30\_5@@ |
| 25% | @@OLDAUDP1\_25@@ | @@OLDAUDP5\_25@@ | @@OLDAUDP10\_25@@ | @@OLDAUDP15\_25@@ | @@OLDAUDP25\_25@@ | @@OLDAUDP30\_25@@ |
| 50% | @@OLDAUDP1\_50@@ | @@OLDAUDP5\_50@@ | @@OLDAUDP10\_50@@ | @@OLDAUDP15\_50@@ | @@OLDAUDP25\_50@@ | @@OLDAUDP30\_50@@ |
| 75% | @@OLDAUDP1\_75@@ | @@OLDAUDP5\_75@@ | @@OLDAUDP10\_75@@ | @@OLDAUDP15\_75@@ | @@OLDAUDP25\_75@@ | @@OLDAUDP30\_75@@ |
| 95% | @@OLDAUDP1\_95@@ | @@OLDAUDP5\_95@@ | @@OLDAUDP10\_95@@ | @@OLDAUDP15\_95@@ | @@OLDAUDP25\_95@@ | @@OLDAUDP30\_95@@ |
| Mean | @@OLDAUDP1\_MU@@ | @@OLDAUDP5\_MU@@ | @@OLDAUDP10\_MU@@ | @@OLDAUDP15\_MU@@ | @@OLDAUDP25\_MU@@ | @@OLDAUDP30\_MU@@ |
| Volatility | @@OLDAUDP1\_VOL@@ | @@OLDAUDP5\_VOL@@ | @@OLDAUDP10\_VOL@@ | @@OLDAUDP15\_VOL@@ | @@OLDAUDP25\_VOL@@ | @@OLDAUDP30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUDP1\_5@@ | @@NEWAUDP5\_5@@ | @@NEWAUDP10\_5@@ | @@NEWAUDP15\_5@@ | @@NEWAUDP25\_5@@ | @@NEWAUDP30\_5@@ |
| 25% | @@NEWAUDP1\_25@@ | @@NEWAUDP5\_25@@ | @@NEWAUDP10\_25@@ | @@NEWAUDP15\_25@@ | @@NEWAUDP25\_25@@ | @@NEWAUDP30\_25@@ |
| 50% | @@NEWAUDP1\_50@@ | @@NEWAUDP5\_50@@ | @@NEWAUDP10\_50@@ | @@NEWAUDP15\_50@@ | @@NEWAUDP25\_50@@ | @@NEWAUDP30\_50@@ |
| 75% | @@NEWAUDP1\_75@@ | @@NEWAUDP5\_75@@ | @@NEWAUDP10\_75@@ | @@NEWAUDP15\_75@@ | @@NEWAUDP25\_75@@ | @@NEWAUDP30\_75@@ |
| 95% | @@NEWAUDP1\_95@@ | @@NEWAUDP5\_95@@ | @@NEWAUDP10\_95@@ | @@NEWAUDP15\_95@@ | @@NEWAUDP25\_95@@ | @@NEWAUDP30\_95@@ |
| Mean | @@NEWAUDP1\_MU@@ | @@NEWAUDP5\_MU@@ | @@NEWAUDP10\_MU@@ | @@NEWAUDP15\_MU@@ | @@NEWAUDP25\_MU@@ | @@NEWAUDP30\_MU@@ |
| Volatility | @@NEWAUDP1\_VOL@@ | @@NEWAUDP5\_VOL@@ | @@NEWAUDP10\_VOL@@ | @@NEWAUDP15\_VOL@@ | @@NEWAUDP25\_VOL@@ | @@NEWAUDP30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDAUDPPERCENTILE@@ | @@OLDAUDPHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWAUDPPERCENTILE@@ | @@NEWAUDPHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUDPIR1\_5@@ | @@OLDAUDPIR5\_5@@ | @@OLDAUDPIR10\_5@@ | @@OLDAUDPIR15\_5@@ | @@OLDAUDPIR25\_5@@ | @@OLDAUDPIR30\_5@@ |
| 25% | @@OLDAUDPIR1\_25@@ | @@OLDAUDPIR5\_25@@ | @@OLDAUDPIR10\_25@@ | @@OLDAUDPIR15\_25@@ | @@OLDAUDPIR25\_25@@ | @@OLDAUDPIR30\_25@@ |
| 50% | @@OLDAUDPIR1\_50@@ | @@OLDAUDPIR5\_50@@ | @@OLDAUDPIR10\_50@@ | @@OLDAUDPIR15\_50@@ | @@OLDAUDPIR25\_50@@ | @@OLDAUDPIR30\_50@@ |
| 75% | @@OLDAUDPIR1\_75@@ | @@OLDAUDPIR5\_75@@ | @@OLDAUDPIR10\_75@@ | @@OLDAUDPIR15\_75@@ | @@OLDAUDPIR25\_75@@ | @@OLDAUDPIR30\_75@@ |
| 95% | @@OLDAUDPIR1\_95@@ | @@OLDAUDPIR5\_95@@ | @@OLDAUDPIR10\_95@@ | @@OLDAUDPIR15\_95@@ | @@OLDAUDPIR25\_95@@ | @@OLDAUDPIR30\_95@@ |
| Mean | @@OLDAUDPIR1\_MU@@ | @@OLDAUDPIR5\_MU@@ | @@OLDAUDPIR10\_MU@@ | @@OLDAUDPIR15\_MU@@ | @@OLDAUDPIR25\_MU@@ | @@OLDAUDPIR30\_MU@@ |
| Volatility | @@OLDAUDPIR1\_VOL@@ | @@OLDAUDPIR5\_VOL@@ | @@OLDAUDPIR10\_VOL@@ | @@OLDAUDPIR15\_VOL@@ | @@OLDAUDPIR25\_VOL@@ | @@OLDAUDPIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUDPIR1\_5@@ | @@NEWAUDPIR5\_5@@ | @@NEWAUDPIR10\_5@@ | @@NEWAUDPIR15\_5@@ | @@NEWAUDPIR25\_5@@ | @@NEWAUDPIR30\_5@@ |
| 25% | @@NEWAUDPIR1\_25@@ | @@NEWAUDPIR5\_25@@ | @@NEWAUDPIR10\_25@@ | @@NEWAUDPIR15\_25@@ | @@NEWAUDPIR25\_25@@ | @@NEWAUDPIR30\_25@@ |
| 50% | @@NEWAUDPIR1\_50@@ | @@NEWAUDPIR5\_50@@ | @@NEWAUDPIR10\_50@@ | @@NEWAUDPIR15\_50@@ | @@NEWAUDPIR25\_50@@ | @@NEWAUDPIR30\_50@@ |
| 75% | @@NEWAUDPIR1\_75@@ | @@NEWAUDPIR5\_75@@ | @@NEWAUDPIR10\_75@@ | @@NEWAUDPIR15\_75@@ | @@NEWAUDPIR25\_75@@ | @@NEWAUDPIR30\_75@@ |
| 95% | @@NEWAUDPIR1\_95@@ | @@NEWAUDPIR5\_95@@ | @@NEWAUDPIR10\_95@@ | @@NEWAUDPIR15\_95@@ | @@NEWAUDPIR25\_95@@ | @@NEWAUDPIR30\_95@@ |
| Mean | @@NEWAUDPIR1\_MU@@ | @@NEWAUDPIR5\_MU@@ | @@NEWAUDPIR10\_MU@@ | @@NEWAUDPIR15\_MU@@ | @@NEWAUDPIR25\_MU@@ | @@NEWAUDPIR30\_MU@@ |
| Volatility | @@NEWAUDPIR1\_VOL@@ | @@NEWAUDPIR5\_VOL@@ | @@NEWAUDPIR10\_VOL@@ | @@NEWAUDPIR15\_VOL@@ | @@NEWAUDPIR25\_VOL@@ | @@NEWAUDPIR30\_VOL@@ |

1. International Alternatives Hedged
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDINTAHP12@@ | @@NEWINTAHP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDINTAHP21@@ | @@NEWINTAHP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDINTAHMU1@@ | @@NEWINTAHMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDINTAHSIGMA1@@ | @@NEWINTAHSIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDINTAHMU2@@ | @@NEWINTAHMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDINTAHSIGMA2@@ | @@NEWINTAHSIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDINTAHY0@@ | @@NEWINTAHY0@@ | The current retrospective dividend yield. |
|  | @@OLDINTAHYMU@@ | @@NEWINTAHYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDINTAHYALPHA@@ | @@NEWINTAHYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDINTAHYSIGMA@@ | @@NEWINTAHYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDINTAHRHO@@ | @@NEWINTAHRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTAH1\_5@@ | @@OLDINTAH5\_5@@ | @@OLDINTAH10\_5@@ | @@OLDINTAH15\_5@@ | @@OLDINTAH25\_5@@ | @@OLDINTAH30\_5@@ |
| 25% | @@OLDINTAH1\_25@@ | @@OLDINTAH5\_25@@ | @@OLDINTAH10\_25@@ | @@OLDINTAH15\_25@@ | @@OLDINTAH25\_25@@ | @@OLDINTAH30\_25@@ |
| 50% | @@OLDINTAH1\_50@@ | @@OLDINTAH5\_50@@ | @@OLDINTAH10\_50@@ | @@OLDINTAH15\_50@@ | @@OLDINTAH25\_50@@ | @@OLDINTAH30\_50@@ |
| 75% | @@OLDINTAH1\_75@@ | @@OLDINTAH5\_75@@ | @@OLDINTAH10\_75@@ | @@OLDINTAH15\_75@@ | @@OLDINTAH25\_75@@ | @@OLDINTAH30\_75@@ |
| 95% | @@OLDINTAH1\_95@@ | @@OLDINTAH5\_95@@ | @@OLDINTAH10\_95@@ | @@OLDINTAH15\_95@@ | @@OLDINTAH25\_95@@ | @@OLDINTAH30\_95@@ |
| Mean | @@OLDINTAH1\_MU@@ | @@OLDINTAH5\_MU@@ | @@OLDINTAH10\_MU@@ | @@OLDINTAH15\_MU@@ | @@OLDINTAH25\_MU@@ | @@OLDINTAH30\_MU@@ |
| Volatilityy | @@OLDINTAH1\_VOL@@ | @@OLDINTAH5\_VOL@@ | @@OLDINTAH10\_VOL@@ | @@OLDINTAH15\_VOL@@ | @@OLDINTAH25\_VOL@@ | @@OLDINTAH30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTAH1\_5@@ | @@NEWINTAH5\_5@@ | @@NEWINTAH10\_5@@ | @@NEWINTAH15\_5@@ | @@NEWINTAH25\_5@@ | @@NEWINTAH30\_5@@ |
| 25% | @@NEWINTAH1\_25@@ | @@NEWINTAH5\_25@@ | @@NEWINTAH10\_25@@ | @@NEWINTAH15\_25@@ | @@NEWINTAH25\_25@@ | @@NEWINTAH30\_25@@ |
| 50% | @@NEWINTAH1\_50@@ | @@NEWINTAH5\_50@@ | @@NEWINTAH10\_50@@ | @@NEWINTAH15\_50@@ | @@NEWINTAH25\_50@@ | @@NEWINTAH30\_50@@ |
| 75% | @@NEWINTAH1\_75@@ | @@NEWINTAH5\_75@@ | @@NEWINTAH10\_75@@ | @@NEWINTAH15\_75@@ | @@NEWINTAH25\_75@@ | @@NEWINTAH30\_75@@ |
| 95% | @@NEWINTAH1\_95@@ | @@NEWINTAH5\_95@@ | @@NEWINTAH10\_95@@ | @@NEWINTAH15\_95@@ | @@NEWINTAH25\_95@@ | @@NEWINTAH30\_95@@ |
| Mean | @@NEWINTAH1\_MU@@ | @@NEWINTAH5\_MU@@ | @@NEWINTAH10\_MU@@ | @@NEWINTAH15\_MU@@ | @@NEWINTAH25\_MU@@ | @@NEWINTAH30\_MU@@ |
| Volatility | @@NEWINTAH1\_VOL@@ | @@NEWINTAH5\_VOL@@ | @@NEWINTAH10\_VOL@@ | @@NEWINTAH15\_VOL@@ | @@NEWINTAH25\_VOL@@ | @@NEWINTAH30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDINTAHPERCENTILE@@ | @@OLDINTAHHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWINTAHPERCENTILE@@ | @@NEWINTAHHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDINTAHIR1\_5@@ | @@OLDINTAHIR5\_5@@ | @@OLDINTAHIR10\_5@@ | @@OLDINTAHIR15\_5@@ | @@OLDINTAHIR25\_5@@ | @@OLDINTAHIR30\_5@@ |
| 25% | @@OLDINTAHIR1\_25@@ | @@OLDINTAHIR5\_25@@ | @@OLDINTAHIR10\_25@@ | @@OLDINTAHIR15\_25@@ | @@OLDINTAHIR25\_25@@ | @@OLDINTAHIR30\_25@@ |
| 50% | @@OLDINTAHIR1\_50@@ | @@OLDINTAHIR5\_50@@ | @@OLDINTAHIR10\_50@@ | @@OLDINTAHIR15\_50@@ | @@OLDINTAHIR25\_50@@ | @@OLDINTAHIR30\_50@@ |
| 75% | @@OLDINTAHIR1\_75@@ | @@OLDINTAHIR5\_75@@ | @@OLDINTAHIR10\_75@@ | @@OLDINTAHIR15\_75@@ | @@OLDINTAHIR25\_75@@ | @@OLDINTAHIR30\_75@@ |
| 95% | @@OLDINTAHIR1\_95@@ | @@OLDINTAHIR5\_95@@ | @@OLDINTAHIR10\_95@@ | @@OLDINTAHIR15\_95@@ | @@OLDINTAHIR25\_95@@ | @@OLDINTAHIR30\_95@@ |
| Mean | @@OLDINTAHIR1\_MU@@ | @@OLDINTAHIR5\_MU@@ | @@OLDINTAHIR10\_MU@@ | @@OLDINTAHIR15\_MU@@ | @@OLDINTAHIR25\_MU@@ | @@OLDINTAHIR30\_MU@@ |
| Volatility | @@OLDINTAHIR1\_VOL@@ | @@OLDINTAHIR5\_VOL@@ | @@OLDINTAHIR10\_VOL@@ | @@OLDINTAHIR15\_VOL@@ | @@OLDINTAHIR25\_VOL@@ | @@OLDINTAHIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWINTAHIR1\_5@@ | @@NEWINTAHIR5\_5@@ | @@NEWINTAHIR10\_5@@ | @@NEWINTAHIR15\_5@@ | @@NEWINTAHIR25\_5@@ | @@NEWINTAHIR30\_5@@ |
| 25% | @@NEWINTAHIR1\_25@@ | @@NEWINTAHIR5\_25@@ | @@NEWINTAHIR10\_25@@ | @@NEWINTAHIR15\_25@@ | @@NEWINTAHIR25\_25@@ | @@NEWINTAHIR30\_25@@ |
| 50% | @@NEWINTAHIR1\_50@@ | @@NEWINTAHIR5\_50@@ | @@NEWINTAHIR10\_50@@ | @@NEWINTAHIR15\_50@@ | @@NEWINTAHIR25\_50@@ | @@NEWINTAHIR30\_50@@ |
| 75% | @@NEWINTAHIR1\_75@@ | @@NEWINTAHIR5\_75@@ | @@NEWINTAHIR10\_75@@ | @@NEWINTAHIR15\_75@@ | @@NEWINTAHIR25\_75@@ | @@NEWINTAHIR30\_75@@ |
| 95% | @@NEWINTAHIR1\_95@@ | @@NEWINTAHIR5\_95@@ | @@NEWINTAHIR10\_95@@ | @@NEWINTAHIR15\_95@@ | @@NEWINTAHIR25\_95@@ | @@NEWINTAHIR30\_95@@ |
| Mean | @@NEWINTAHIR1\_MU@@ | @@NEWINTAHIR5\_MU@@ | @@NEWINTAHIR10\_MU@@ | @@NEWINTAHIR15\_MU@@ | @@NEWINTAHIR25\_MU@@ | @@NEWINTAHIR30\_MU@@ |
| Volatility | @@NEWINTAHIR1\_VOL@@ | @@NEWINTAHIR5\_VOL@@ | @@NEWINTAHIR10\_VOL@@ | @@NEWINTAHIR15\_VOL@@ | @@NEWINTAHIR25\_VOL@@ | @@NEWINTAHIR30\_VOL@@ |

1. Australian Infrastructure
   1. Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | @@OLDDATE@@ | @@CALIBDATE@@ | Description |
|  | 0 | 0 | The mean drift of the underlying GBM model. Note: this is set to zero as the volatility model provides the mean return in the specific regime. |
| **Volatility Model (Regime Switching)** | | | |
|  | @@OLDAUIP12@@ | @@NEWAUIP12@@ | The probability of changing from regime 1 into regime 2 over a one year period. |
|  | @@OLDAUIP21@@ | @@NEWAUIP21@@ | The probability of changing from regime 2 into regime 1 over a one year period. |
|  | @@OLDAUIMU1@@ | @@NEWAUIMU1@@ | The mean drift of the GBM when in regime 1. |
|  | @@OLDAUISIGMA1@@ | @@NEWAUISIGMA1@@ | The volatility of the GBM when in regime 1 |
|  | @@OLDAUIMU2@@ | @@NEWAUIMU2@@ | The mean drift of the GBM when in regime 2. |
|  | @@OLDAUISIGMA2@@ | @@NEWAUISIGMA2@@ | The volatility of the GBM when in regime 2. |
| **Income Yield Model (Ornstein Uhlenbeck)** | | | |
|  | @@OLDAUIY0@@ | @@NEWAUIY0@@ | The current retrospective dividend yield. |
|  | @@OLDAUIYMU@@ | @@NEWAUIYMU@@ | The long-term mean reversion level of the dividend yield |
|  | @@OLDAUIYALPHA@@ | @@NEWAUIYALPHA@@ | The speed of mean reversion of the dividend yield |
|  | @@OLDAUIYSIGMA@@ | @@NEWAUIYSIGMA@@ | The volatility of the dividend yield |
|  | @@OLDAUIRHO@@ | @@NEWAUIRHO@@ | The correlation between the dividend yield process and the total return process |

* 1. Distributions
     1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUI1\_5@@ | @@OLDAUI5\_5@@ | @@OLDAUI10\_5@@ | @@OLDAUI15\_5@@ | @@OLDAUI25\_5@@ | @@OLDAUI30\_5@@ |
| 25% | @@OLDAUI1\_25@@ | @@OLDAUI5\_25@@ | @@OLDAUI10\_25@@ | @@OLDAUI15\_25@@ | @@OLDAUI25\_25@@ | @@OLDAUI30\_25@@ |
| 50% | @@OLDAUI1\_50@@ | @@OLDAUI5\_50@@ | @@OLDAUI10\_50@@ | @@OLDAUI15\_50@@ | @@OLDAUI25\_50@@ | @@OLDAUI30\_50@@ |
| 75% | @@OLDAUI1\_75@@ | @@OLDAUI5\_75@@ | @@OLDAUI10\_75@@ | @@OLDAUI15\_75@@ | @@OLDAUI25\_75@@ | @@OLDAUI30\_75@@ |
| 95% | @@OLDAUI1\_95@@ | @@OLDAUI5\_95@@ | @@OLDAUI10\_95@@ | @@OLDAUI15\_95@@ | @@OLDAUI25\_95@@ | @@OLDAUI30\_95@@ |
| Mean | @@OLDAUI1\_MU@@ | @@OLDAUI5\_MU@@ | @@OLDAUI10\_MU@@ | @@OLDAUI15\_MU@@ | @@OLDAUI25\_MU@@ | @@OLDAUI30\_MU@@ |
| Volatility | @@OLDAUI1\_VOL@@ | @@OLDAUI5\_VOL@@ | @@OLDAUI10\_VOL@@ | @@OLDAUI15\_VOL@@ | @@OLDAUI25\_VOL@@ | @@OLDAUI30\_VOL@@ |

* + 1. Total Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUI1\_5@@ | @@NEWAUI5\_5@@ | @@NEWAUI10\_5@@ | @@NEWAUI15\_5@@ | @@NEWAUI25\_5@@ | @@NEWAUI30\_5@@ |
| 25% | @@NEWAUI1\_25@@ | @@NEWAUI5\_25@@ | @@NEWAUI10\_25@@ | @@NEWAUI15\_25@@ | @@NEWAUI25\_25@@ | @@NEWAUI30\_25@@ |
| 50% | @@NEWAUI1\_50@@ | @@NEWAUI5\_50@@ | @@NEWAUI10\_50@@ | @@NEWAUI15\_50@@ | @@NEWAUI25\_50@@ | @@NEWAUI30\_50@@ |
| 75% | @@NEWAUI1\_75@@ | @@NEWAUI5\_75@@ | @@NEWAUI10\_75@@ | @@NEWAUI15\_75@@ | @@NEWAUI25\_75@@ | @@NEWAUI30\_75@@ |
| 95% | @@NEWAUI1\_95@@ | @@NEWAUI5\_95@@ | @@NEWAUI10\_95@@ | @@NEWAUI15\_95@@ | @@NEWAUI25\_95@@ | @@NEWAUI30\_95@@ |
| Mean | @@NEWAUI1\_MU@@ | @@NEWAUI5\_MU@@ | @@NEWAUI10\_MU@@ | @@NEWAUI15\_MU@@ | @@NEWAUI25\_MU@@ | @@NEWAUI30\_MU@@ |
| Volatility | @@NEWAUI1\_VOL@@ | @@NEWAUI5\_VOL@@ | @@NEWAUI10\_VOL@@ | @@NEWAUI15\_VOL@@ | @@NEWAUI25\_VOL@@ | @@NEWAUI30\_VOL@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@OLDAUIPERCENTILE@@ | @@OLDAUIHIST@@ |

* + 1. Total Return Charts – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |
| --- | --- |
| Percentile Distribution | Histogram @ 10 years |
| @@NEWAUIPERCENTILE@@ | @@NEWAUIHIST@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@OLDDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@OLDAUIIR1\_5@@ | @@OLDAUIIR5\_5@@ | @@OLDAUIIR10\_5@@ | @@OLDAUIIR15\_5@@ | @@OLDAUIIR25\_5@@ | @@OLDAUIIR30\_5@@ |
| 25% | @@OLDAUIIR1\_25@@ | @@OLDAUIIR5\_25@@ | @@OLDAUIIR10\_25@@ | @@OLDAUIIR15\_25@@ | @@OLDAUIIR25\_25@@ | @@OLDAUIIR30\_25@@ |
| 50% | @@OLDAUIIR1\_50@@ | @@OLDAUIIR5\_50@@ | @@OLDAUIIR10\_50@@ | @@OLDAUIIR15\_50@@ | @@OLDAUIIR25\_50@@ | @@OLDAUIIR30\_50@@ |
| 75% | @@OLDAUIIR1\_75@@ | @@OLDAUIIR5\_75@@ | @@OLDAUIIR10\_75@@ | @@OLDAUIIR15\_75@@ | @@OLDAUIIR25\_75@@ | @@OLDAUIIR30\_75@@ |
| 95% | @@OLDAUIIR1\_95@@ | @@OLDAUIIR5\_95@@ | @@OLDAUIIR10\_95@@ | @@OLDAUIIR15\_95@@ | @@OLDAUIIR25\_95@@ | @@OLDAUIIR30\_95@@ |
| Mean | @@OLDAUIIR1\_MU@@ | @@OLDAUIIR5\_MU@@ | @@OLDAUIIR10\_MU@@ | @@OLDAUIIR15\_MU@@ | @@OLDAUIIR25\_MU@@ | @@OLDAUIIR30\_MU@@ |
| Volatility | @@OLDAUIIR1\_VOL@@ | @@OLDAUIIR5\_VOL@@ | @@OLDAUIIR10\_VOL@@ | @@OLDAUIIR15\_VOL@@ | @@OLDAUIIR25\_VOL@@ | @@OLDAUIIR30\_VOL@@ |

* + 1. Income Return Percentiles – Annually Compounded 1 Year Returns (@@CALIBDATE@@)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| %’ile | 1yr | 5yr | 10yr | 15yr | 20yr | 30yr |
| 5% | @@NEWAUIIR1\_5@@ | @@NEWAUIIR5\_5@@ | @@NEWAUIIR10\_5@@ | @@NEWAUIIR15\_5@@ | @@NEWAUIIR25\_5@@ | @@NEWAUIIR30\_5@@ |
| 25% | @@NEWAUIIR1\_25@@ | @@NEWAUIIR5\_25@@ | @@NEWAUIIR10\_25@@ | @@NEWAUIIR15\_25@@ | @@NEWAUIIR25\_25@@ | @@NEWAUIIR30\_25@@ |
| 50% | @@NEWAUIIR1\_50@@ | @@NEWAUIIR5\_50@@ | @@NEWAUIIR10\_50@@ | @@NEWAUIIR15\_50@@ | @@NEWAUIIR25\_50@@ | @@NEWAUIIR30\_50@@ |
| 75% | @@NEWAUIIR1\_75@@ | @@NEWAUIIR5\_75@@ | @@NEWAUIIR10\_75@@ | @@NEWAUIIR15\_75@@ | @@NEWAUIIR25\_75@@ | @@NEWAUIIR30\_75@@ |
| 95% | @@NEWAUIIR1\_95@@ | @@NEWAUIIR5\_95@@ | @@NEWAUIIR10\_95@@ | @@NEWAUIIR15\_95@@ | @@NEWAUIIR25\_95@@ | @@NEWAUIIR30\_95@@ |
| Mean | @@NEWAUIIR1\_MU@@ | @@NEWAUIIR5\_MU@@ | @@NEWAUIIR10\_MU@@ | @@NEWAUIIR15\_MU@@ | @@NEWAUIIR25\_MU@@ | @@NEWAUIIR30\_MU@@ |
| Volatility | @@NEWAUIIR1\_VOL@@ | @@NEWAUIIR5\_VOL@@ | @@NEWAUIIR10\_VOL@@ | @@NEWAUIIR15\_VOL@@ | @@NEWAUIIR25\_VOL@@ | @@NEWAUIIR30\_VOL@@ |

1. Correlations
   1. Overview
      1. Correlations are controlled through shocks to the state variables of each of the models and also through structure imposed by the assumption that risky assets are built using a cash plus excess return approach.
      2. The correlation table below shows the correlation between the various asset classes’ total return and rate for the CPI and AWE model. The correlation is determined using data for timestep ten. As copulas are not currently used in this setup this correlation table will be valid for all other timesteps.
   2. Asset class correlations

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Cash | CPI | AWE | Australian Equities | International Equities Hedged | International Equities UnHedged | Emerging Market Equities | Australian Fixed Interest Govt | Australian Fixed Interest Corporate | International Fixed Interest Govt Hedged | Australian Listed Property | Australian Direct Property | International Alternatives Hedged | Australian Infrastructure |
| Cash | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CPI |  | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |
| AWE |  |  | 1.00 |  |  |  |  |  |  |  |  |  |  |  |
| Australian Equities |  |  |  | 1.00 |  |  |  |  |  |  |  |  |  |  |
| International Equities Hedged |  |  |  |  | 1.00 |  |  |  |  |  |  |  |  |  |
| International Equities UnHedged |  |  |  |  |  | 1.00 |  |  |  |  |  |  |  |  |
| Emerging Market Equities |  |  |  |  |  |  | 1.00 |  |  |  |  |  |  |  |
| Australian Fixed Interest Govt |  |  |  |  |  |  |  | 1.00 |  |  |  |  |  |  |
| Australian Fixed Interest Corporate |  |  |  |  |  |  |  |  | 1.00 |  |  |  |  |  |
| International Fixed Interest Govt Hedged |  |  |  |  |  |  |  |  |  | 1.00 |  |  |  |  |
| Australian Listed Property |  |  |  |  |  |  |  |  |  |  | 1.00 |  |  |  |
| Australian Direct Property |  |  |  |  |  |  |  |  |  |  |  | 1.00 |  |  |
| International Alternatives Hedged |  |  |  |  |  |  |  |  |  |  |  |  | 1.00 |  |
| Australian Infrastructure |  |  |  |  |  |  |  |  |  |  |  |  |  | 1.00 |