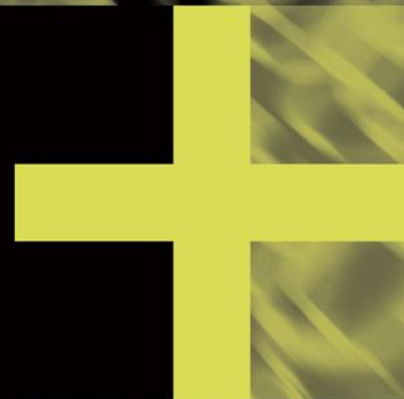


B+H Hedge

barrie+hibbert

Powering objectivity in the global financial services industry



## B+H Hedge at a Glance

### +General model functions

- Unlimited simulations
- All model parameters editable
- Alternative parameters views
- Bulk import
- Multi-economy, multi currency

### +Interest rates & bonds

- Nominal & real yield curves that can be calibrated to swaption-implied volatilities
- Stochastic credit spreads and defaults
- Bond portfolios

### +Equity & Alternatives

- Multiple equity indices jointly modelled using Heston-with jumps
- Simultaneous fitting to multiple option-implied volatility surfaces
- Real-world projection with fat tails and stochastic correlation
- Real estate indices
- Alternative assets

### +Portfolio modelling

- Create specific portfolios

### +Calibration

- Automated calibration functionality to facilitate press-of-a-button calibration and scenario set production for calculation of multiple *Greeks*.

## Economic Scenario Modelling for Variable Annuity Hedging

Recent times have clearly represented a challenging period for the global economy and the financial services sector in particular. The insurance sector has not been immune from such malaise. In particular the volatile financial market environment has exposed the limitations of some companies' strategies for managing the market risk exposures created by the provision of significant long-term guarantees in VA products.

Based on Barrie & Hibbert's world-leading core insurance ESG product, and extended to meet the specialist demands of complex VA hedging applications, B+H Hedge represents a global best-of-breed software service solution for hedging groups that wish to maintain leading-edge internal modelling capabilities.

B+H Hedge is an ESG modelling and calibration software service for use in fast, accurate calculation of VA hedging greeks.

It also provides a real-world modelling capability that can be used in hedging strategy projection (including use of stochastic-on-stochastic).

## ESG Modelling

Market-consistent multi-asset stochastic modelling for calculation of multiple *Greeks*:

- Joint market-consistent stochastic modelling of multiple equity indices, yield curves and credit risk. Alternative asset modelling for asset classes such as hedge funds and commodities is also available.
- Can be run in multi-currency setting with correlated economies and stochastic FX rates.
- Simultaneous fits to multiple (correlated) equity indices' option-implied volatility surfaces using Heston-with-jump-diffusion model.
- Arbitrage-free yield curve modelling and the ability to fit to swaption-implied volatility matrices.
- Integrated credit risk modelling (credit spreads and rating transitions / defaults), allowing rigorous measurement of the impact of credit-risky funds on VA liability valuations and greeks.
- Asset modelling choices within the software that can be used to analyse model risk.

## Real-world multi-asset stochastic modelling for hedging strategy projection:

- Joint real-world projection of equity indices, yield curves, credit risks and option-implied volatility surfaces.
- Stochastic-volatility-with-jumps model provides integrated real-world joint modelling of underlying equity return volatilities and option-implied volatility surface changes. The stochastic jump process provides capability to capture the gamma and gap risks that arise in dynamic hedging programs due to exposure to extreme short-term market movements.
- Can be used in automated stochastic-on-stochastic runs for stochastic projection of hedge performance (automated, dynamic re-calibration of inner simulations consistently with projected outer simulation variables).

## Calibration tools and services

Calibration software provides automated market-consistent re-calibration and scenario set production capability.

This is used by clients in automated overnight multi-greek calculation for daily hedge re-balancing / monitoring including *delta*, *gamma*, *rho*, *vega* and *second-order* and *cross-greeks*.

Real-world calibration service provides regular calibration updates for all subscribed asset classes and economies.

## Software

- Software provided in Microsoft .Net in professional development and testing environment.
- Software is grid-enabled. API available.
- Easily integrated with standard actuarial modelling software.
- User friendly interface embedded Help System.

The screenshot shows the 'Economic Scenario Generator' software interface. The 'Input' table is as follows:

Name	Type	Value
MeanReversionRate	Parameter	3.7584603561944
Volatility	Parameter	0.5
MeanReversionLevel	Parameter	0.0155937146237869
InitialValue	Parameter	0.0643052000913083
Correlation	Parameter	-0.53

## Support, training and consultancy

- Training and ongoing (technical and actuarial) support embedded in product service.
- Consultancy services available relating to hedge implementation and appraisal.

If you would like to know more about our B+H Hedge, then please contact us at any of our offices below.

## About Barrie & Hibbert

Barrie & Hibbert was established in 1995 by John Hibbert and Andrew Barrie. Our primary focus is the identification, quantification and management of financial risk in savings and investment products, institutional investment portfolios and complex financial liabilities.

Collectively our staff of leading academics, quantitative analysts, actuaries and software engineers offer a depth and breadth of expertise combined with an unrivalled track record of experience in implementing risk solution for financial institutions around the world.

Our asset and product modelling capability has been developed over the last 14 years resulting in Barrie & Hibbert becoming a global leader in stochastic asset modelling services.

The understanding of market risk is central to objective financial management. Our market-leading stochastic modelling framework allows our clients to model economic and asset scenarios to help to improve their understanding of financial market risk – and to make any appropriate adjustments within their business.

Our modelling framework, the Economic Scenario Generator (ESG), is the engine that powers our range of products and services. Rather than attempt to create a single model and calibration for every application, Barrie & Hibbert has developed a toolbox of academically robust models within a consistent framework that can be adapted to meet our clients' requirements.

Experience has taught us that different clients have different ways of working to suit their capabilities, organisational structure and geographic presence. As a consequence, our modelling solutions are deployed in a number of ways to suit each client's individual needs.

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