Morningstar EnCorr

Understanding Ibbotson's Building Blocks and Black-Litterman Input Methodologies

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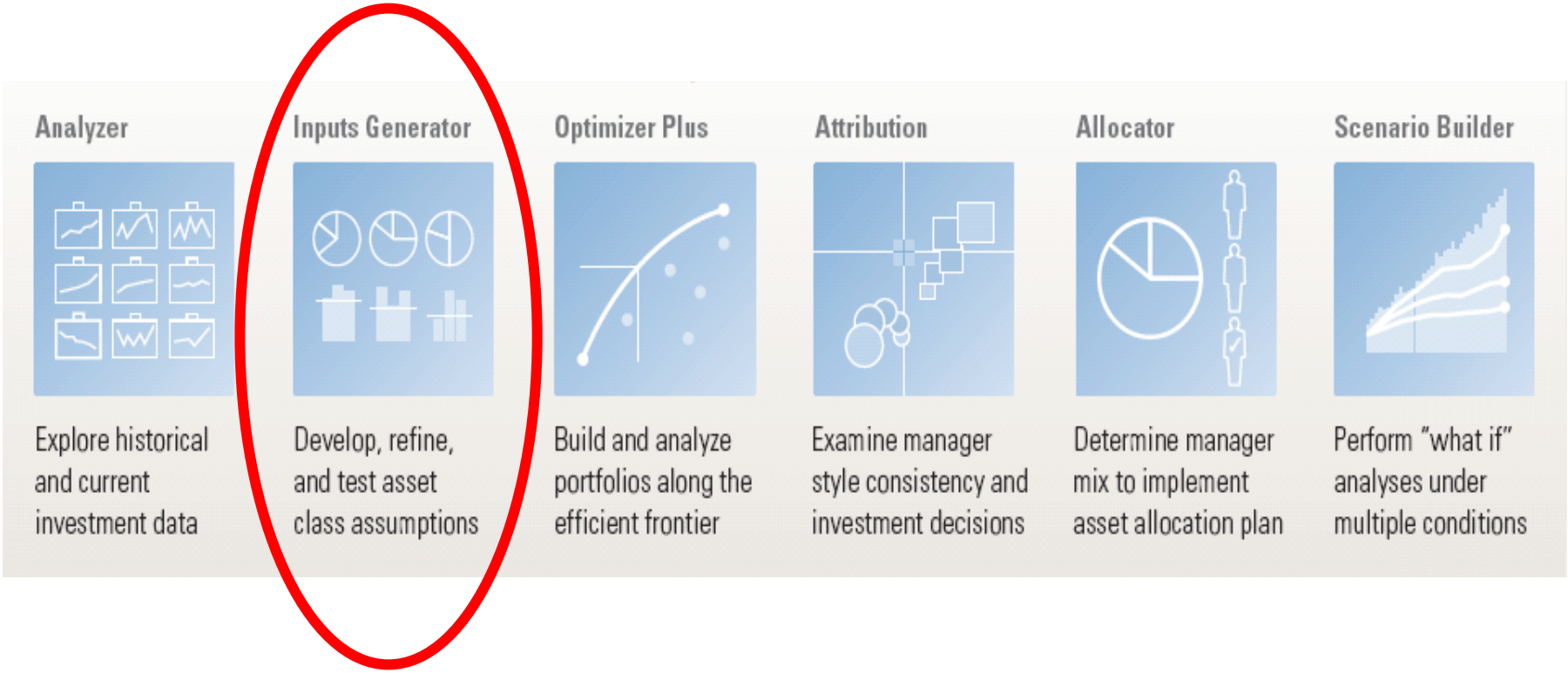
EnCorr Modules



Inputs Generator Overview

- Description:
  - EnCorr Inputs Generator creates, refines, and tests asset class assumptions to be used in the Optimizer.
- Highlights:
  - Create optimization inputs by selecting asset classes from various databases or by entering your own inputs.
  - Select from input methodologies to develop forward looking expected returns.

Inputs Generator Overview

- Expected Return Theory:
  - To determine the asset mix of the optimal portfolio, you need to know the *nature of the possible returns of each asset class*, along with the *relationship between the different asset's returns*. These expectations are known as optimization inputs.
    - Optimization requires three inputs:
      - Expected return of each asset
      - Standard deviation of the asset returns
      - Correlation between asset returns

Inputs Generator Overview

- Optimization Inputs:
  - Historical Data are inputs created with historical data, located in Expected Return tab.
  - Refined Expectations are inputs that can be developed based on forward looking methodologies, such as the Building Blocks and Black Litterman, located in Expected Return tab.
  - User Defined Numbers are inputs where users can overwrite any values in an inputs file with their own expectations, located in the Inputs Summary tab

Building Blocks Methodology

- Created by Ibbotson Associates, where the expected return on an asset class represents the sum of the current risk free rate and one or more historical risk premia or building blocks.
  - By combining current expectations with historical risk premia, you take into account current market conditions (the economic expectations of investors) and historical market returns.

Building Blocks Expected Return Calculation Table

▶Building Block Equity Model

Expected Return	= Current Risk Free Rate + Equity Risk Premium + Small Stock Premium
Risk Free	= Current risk free rate expectation for your investment horizon
	= Current Risk Free Rate
Equity Risk	= Historical premium for investing in risky equities
	= Domestic Equity PBS – Historical Risk Free Rate series
Custom	= Historical premium for investing in risky small company stocks
	= Asset class to refine – Domestic Equity PBS

▶Building Block Fixed Inome Model

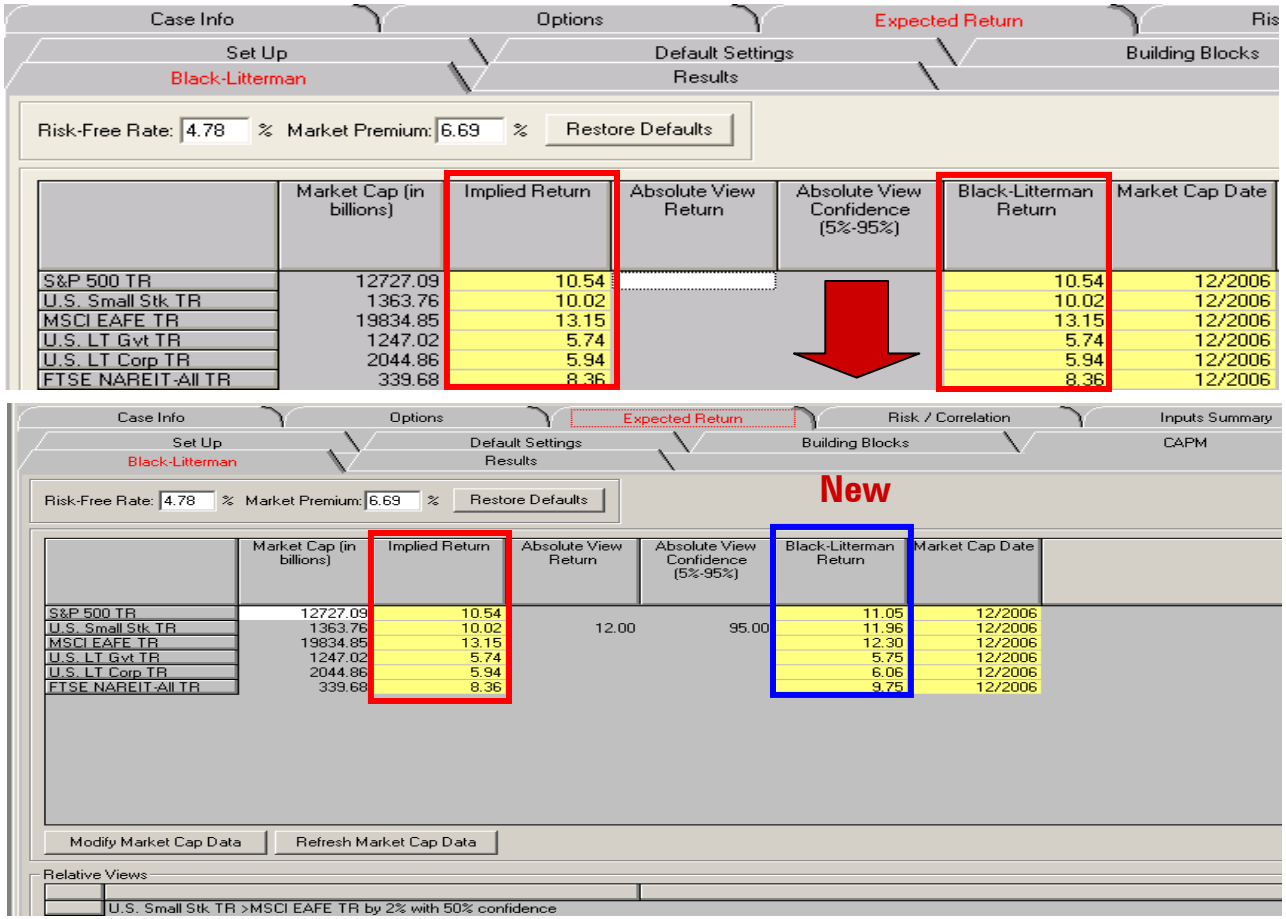
Expected Return	= Cash + Horizon + Default
Cash	= Current risk free rate for your investment horizon with the maturity component removed
	= Current Risk Free Rate – Horizon Premium where Horizon Premium = Historical Risk Free Rate – Horizon PBS
Horizon	= Historical premium for investing in longer maturity bonds. Match the maturity of the asset with the Horizon slider bar.
Default	= Historical premium for investing in risky corporate bonds in order to compensates for the possibility of default.
	= (Asset class to refine) – (Default Premium PBS)

Black Litterman Methodology

- Created by Fischer Black and Robert Litterman, the Black-Litterman model starts with CAPM-based market equilibrium expected returns which are derived by using the reverse optimization approach proposed by Sharpe [1970].
  - The required inputs are the risk-free rate, an estimate of the market premium, estimates of each asset's market capitalization and standard deviation, and the asset class correlations.
    - These starting expected returns can then be refined by incorporating the user's particular beliefs, or "views", about the asset classes both in absolute or relative terms while assigning a confidence factor of 5%-95% to each view, whether absolute or relative.

Black Litterman Expected Return Calculation Table

- Calculation Table



Summary of Expected Return Calculation Components

		Function of		
Building Blocks	Weight =	Return	Stdev	Correlation
CAPM	Weight =	Return	Stdev	Correlation
Black-Litterman	Return =	Weight	Stdev	Correlation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