MSCI Barra and RiskMetrics Portfolio and Risk Analytics in Charles River IMS

Charles River
A State Street Company

Investment managers, asset owners, insurers, and wealth managers can now access MSCI Portfolio and Risk Analytics from the Charles River Investment Management Solution (Charles River IMS). Charles River's portfolio management, risk and attribution capabilities, combined with MSCI portfolio and risk analytics enable firms to generate timelier risk forecasts, more clearly attribute investment returns, and bring differentiated factor-based investment products to market faster.

Leveraging Charles River's single data model and manager workbench, MSCI provides investment and risk professionals with a common language for identifying and communicating the sources of market, credit, liquidity, and counterparty risk across asset classes, including private assets.

Investment Professional Benefits	Firm-wide Benefits
Single desktop user experience	Operate from a consistent understanding of risk across the front, middle, and back office
Tightly coupled portfolio construction and optimization	Manage all funds, strategies and accounts on a single enterprise platform
Seamless access to factor models and MSCI analytics across risk and attribution workflows	Facilitate collaboration across staff roles and business units

Charles River IMS clients gain access to MSCI/Barra equity, fixed income, and multi-asset class factor models, Barra Attribution, RiskMetrics extensive global security and constituent-level data, MSCI LiquidityMetrics, and the Barra Optimizer:

Over 300 MSCI Barra Equity Models help fund managers construct, manage and analyse equity portfolios across developed, emerging and frontier markets through multiple investment time horizons. With MSCI's extensively researched and intuitive fundamental factors, fund managers can identify sources of global equity returns that are common across a broad set of securities and estimate their associated risks.

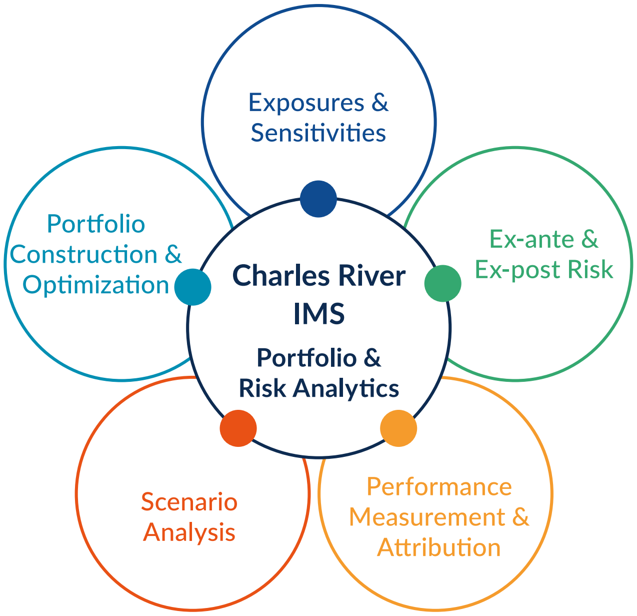
MSCI Barra Fixed Income Factor Models provide global fixed income asset and instrument coverage. The model incorporates Duration Times Spread (DTS) and basis factors as risk indicators. DTS informs investment managers of rapidly changing credit quality, allowing managers to quickly assess the risk and exposure of their investments. Basis factors such as cash versus CDS and on-the-run vs. off-the-run treasuries provide tools for managing trade risks.

MSCI Multi-Asset Class (MAC) Factor Models help firms construct and manage asset-class and factor-based allocation strategies by providing insights into key exposures across all asset classes. The MAC models' tiered structure enforces consistency across the investment process and simplifies communication of exposures by providing:

Detailed exposures for portfolio managers

Core exposures for asset class managers

Global exposures for asset allocators



MSCI's Portfolio and Risk Analytics in Charles River IMS

In addition to State Street's Liquidity Cost Scores (LCS), clients can now access **MSCI LiquidityMetrics** for multi-asset liquidity risk analytics using MSCI's market impact models and liquidity surfaces to understand time, cost, and size dimensions of liquidity.

MSCI Barra Attribution and Performance Analytics extends Charles River PMAR with industry proven capabilities. Clients can analyse their entire hierarchy of portfolios to understand sources of return and risk side-by-side, using the Multi-Portfolio Attribution model (MPA). MSCI also enables flexible and granular return decomposition aligned with a portfolio manager's investment strategy and required granularity.

MSCI's RiskMetrics RiskManager provides risk analytics across a broad range of publicly traded instruments and private assets including Value-at-Risk simulation methodologies, robust stress tests, market exposure and sensitivity analysis. Charles River clients can access MSCI's rich security master containing 22 million unique securities across the full spectrum of asset classes and over 2 million quality-assured time series. Constituent-level information for relative and look-through analysis is available for 370K benchmarks and over 290K equity and fixed income mutual funds and ETFs*.

MSCI's Barra Optimizer helps fund managers create efficient portfolios across indexed, active and market neutral strategies. Portfolios can be optimized using a broad range of constraints, including trade volume, long/short, sector, industry, country, currency, and transaction costs. Portfolio tax minimization is supported, and integration with Charles River Compliance enables constraints including security exclusions, restrictions and category limits.

MSCI Barra Risk Models

- 300+ Models Across Multiple Time Horizons
- Global and Local Equity Models
- Fixed Income
- Private Equity, Real Estate, Hedge Funds
- Multi-Asset Class

MSCI LiquidityMetrics

- Regulatory Reporting
- Liquidity Risk Management

Attribution

- Brinson and Factor
- Equity, Fixed Income, Multi-Asset Class

RiskMetrics

- Single Security Analytics with Multiple Levels of Aggregation to Portfolios/Funds, Attributes like Industry and Sector, and Custom Attributes like Trader and Business Units
- Exposures and Sensitivities
- Distributional Statistics (VaR, Volatility, Tracking Error)
- Stress Tests
- Granular Basis Risk

Optimizer

- Tax-aware
- Multi-portfolio
- Flexible Constraints

* As of February 2020

ABOUT MSCI

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 45 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process. To learn more, please visit www.msci.com.

ABOUT CHARLES RIVER, A STATE STREET COMPANY

Investment firms, asset owners, wealth managers, hedge funds and insurers in over 30 countries rely on the Charles River Investment Management Solution (Charles River IMS) to manage US$28 Trillion. Together with State Street's middle and back office services, Charles River technology forms the foundation of the State Street Alpha℠ platform. Charles River IMS helps firms automate and simplify their investment process across asset classes, from portfolio management and risk analytics through trading and post-trade settlement, with integrated compliance and managed data throughout. Charles River's growing third-party provider ecosystem enables clients to seamlessly access the data and analytics, applications and liquidity venues that support the unique demands of their product and asset class mix. Headquartered in Burlington, Massachusetts, we serve clients globally with more than 1,000 employees in 11 regional offices. For more information, please visit www.crd.com. (Statistics as of January 2020)

ABOUT STATE STREET CORPORATION

State Street Corporation (NYSE: STT) is the world's leading provider of financial services to institutional investors including investment servicing, investment management and investment research and trading. With $34.36 trillion in assets under custody and administration and $3.12 trillion* in assets under management as of December 31, 2019, State Street operates globally in more than 100 geographic markets and employs approximately 39,000 worldwide. For more information, visit State Street's website at www.statestreet.com.

*Assets under management as of December 31, 2019 includes approximately $45 billion of assets with respect to which State Street Global Advisors Funds Distributors, LLC (SSGA FD) serves as marketing agent; SSGA FD and State Street Global Advisors® are affiliated.

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