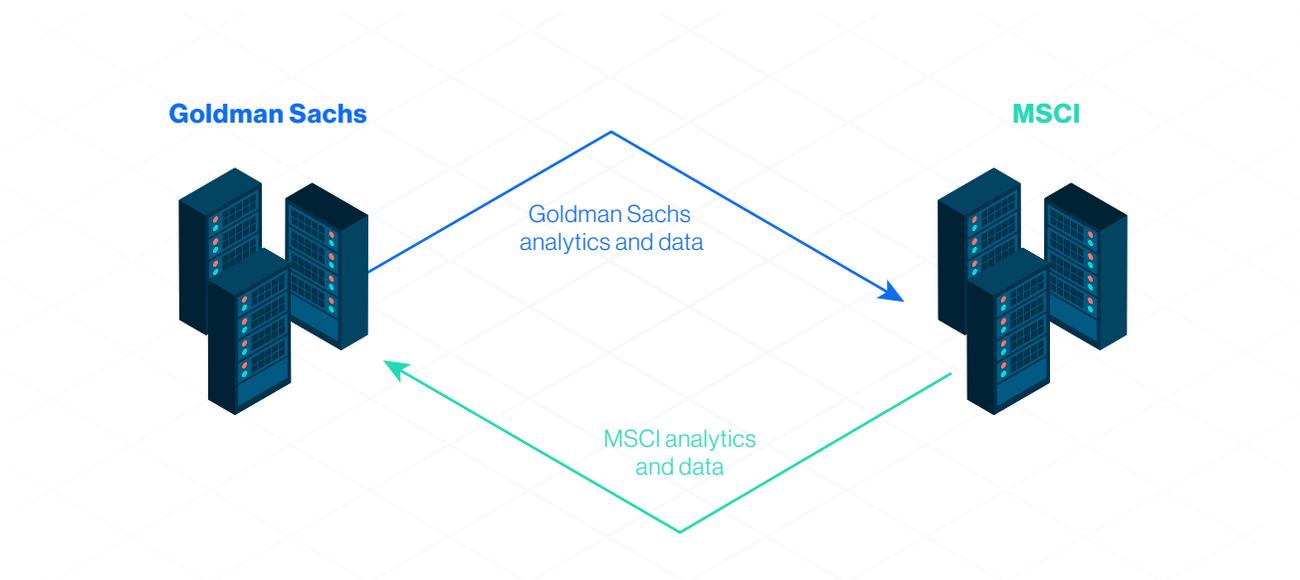


The power of Goldman Sachs and MSCI

Goldman Sachs and MSCI have come together to exchange data and analytics across their institutional client platforms. Leveraging the combined expertise of both firms in data and risk, this collaboration aims to deliver improved portfolio analytics capabilities that translate to actionable insights, while simplifying workflows for increased efficiency.

Goldman Sachs + MSCI



Goldman Sachs

The Goldman Sachs Group, Inc. is a leading global investment banking, securities, and investment management firm that provides a wide range of financial services to a diversified client base that includes corporations, financial institutions, governments, and individuals. Marquee is Goldman Sachs' digital storefront for institutional client services, delivering the Firm's market insights, analytical tools, execution services, and developer and data services directly to clients via an integrated platform.

marquee.gs.com

MSCI

MSCI is a leading provider of critical decision-support tools and services for the global investment community. With over 50 years of expertise in research, data and technology, MSCI powers better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. MSCI creates industry-leading, research-enhanced solutions risk and performance analytics that help clients build better portfolios and communicate with clients more effectively through an integrated view of risk and return.

www.msci.com

Helping Clients Build Better Portfolios and Workflows

By exchanging data across their institutional platforms, Goldman Sachs and MSCI help clients strengthen their analytic capabilities, improve portfolio insights and build workflow efficiency.

Powerful Models, Robust Data

Expanded data and functionality across Goldman Sachs and MSCI platforms provides clients with leading market tools to explore portfolio risk and return characteristics; discover hidden risk factors; and take actions to align portfolios with investment strategies



Rich datasets and advanced risk factor models create powerful analytical tools

Seamless API Integration

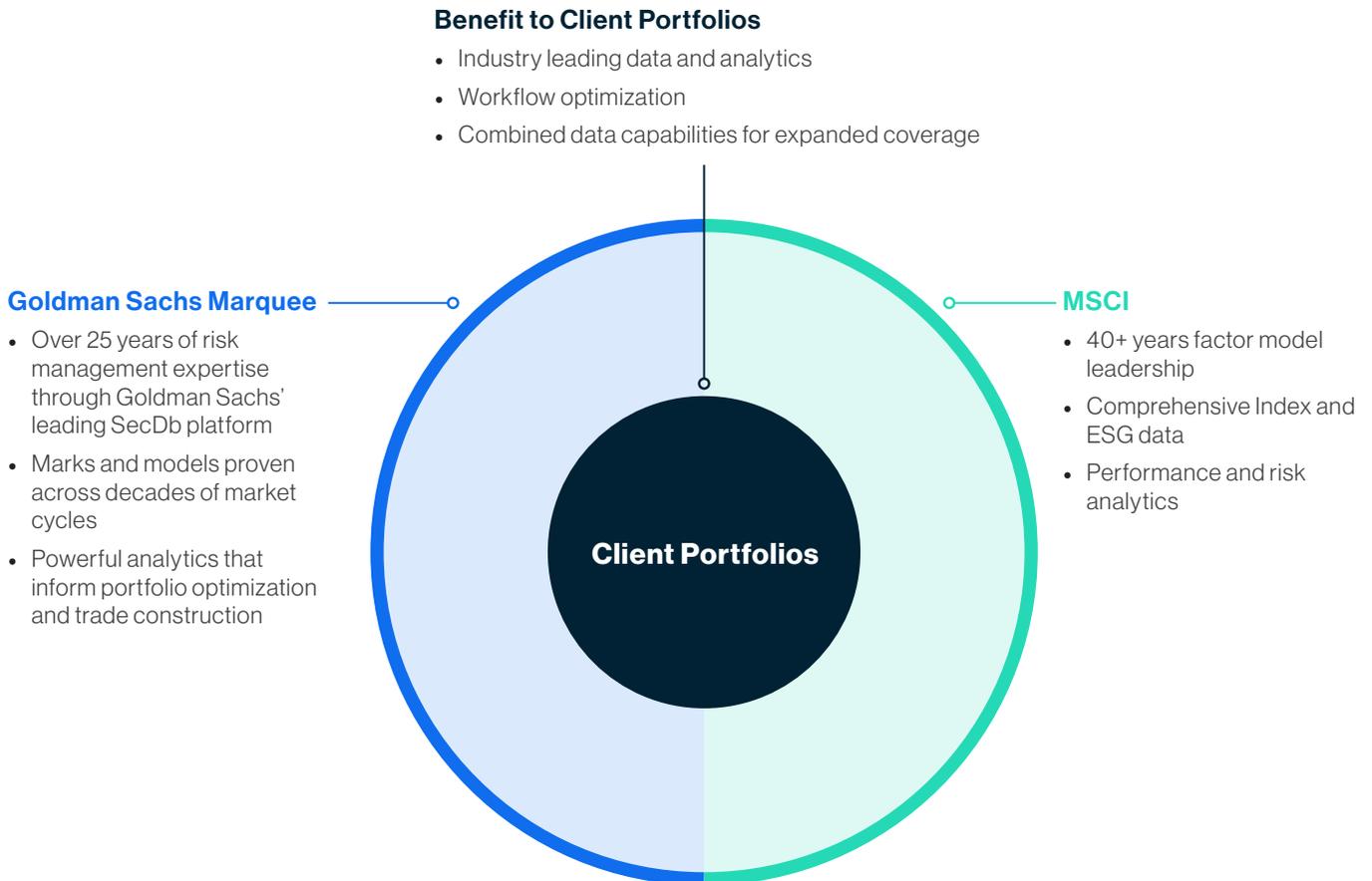
Cutting-edge technology platforms strengthen workflows across ideation, construction, and ongoing risk management



Faster translation of insights to action

A Partnership of Firsts

For the first time, MSCI is making their industry-leading factor models directly accessible through Goldman Sachs' Marquee platform. Likewise, MSCI clients are now able to access Goldman Sachs derivatives data directly, creating an expanded dataset offering. Over time, additional datasets, features and functionality will be added.



MSCI Equity Factor Risk Models

Trusted by many of the world’s largest investors and managers

Market-leading risk factor models built upon decades of experience

Since the creation of the first multi-factor Barra model in 1975, MSCI has developed over 70 Equity Factor Models in consultation with the world’s largest investors and backed by four decades of factor data research.



Equity Factor innovation: designing solutions built upon decades of expertise and pushing the boundaries to meet modern investment needs



High quality standards and stability: ensuring clients can effectively and consistently manage their strategies and build better portfolios



Broad range of best-in-class choice: catering for global, regional, and single country-focused investors, offering models suited to best fit their needs and objectives across their comprehensive investment strategies and horizons

Multiple ways to access via Goldman Sachs’ flexible Portfolio Analytics ecosystem

1. Programmatic risk management

GS Quant, Goldman Sachs’ open-source Python toolkit, provides a programmatic environment to interact with the firm’s equity portfolio risk tools and proprietary data, and MSCI’s Factor Risk models

2. Time series visualization

One of the most popular tools on Goldman Sachs’ trading floors, PlotTool Pro, offers powerful time series visualization and analysis of a portfolio’s factor performance and risk

3. Portfolio risk decomposition and analysis

Goldman Sachs Marquee offers a highly intuitive and secure web interface to upload, analyze and share portfolios, understand sources of risk through the lens of the MSCI Factor Risk models, and control risk exposure with custom hedges



Available MSCI Equity Models

MSCI Equity Models provide institutional investors with the tools to understand the drivers of equity risk and return through a common set of factors:

- **Wide geographical coverage:** models are available at a global, regional, or country-specific level
- **Extensive range of style factors and industry factors:** style factors reflect MSCI's latest research on sources of risk and return and industry factors capture the varying industry-related sensitivities of firms, resulting in more precise attribution of stock returns
- **Multiple investment horizons:**
 - Long horizon (6-12 months): Smoother and more stable behavior over time. Lower turnover factors.
 - Short/Mid-Horizon (1-3 months): More reactive model (often with additional factors). Appealing to Fundamental Managers.
 - Trading Horizon (daily-weekly): reactive with the largest set of systematic factors (higher turnover factors), designed to capture daily market dynamics, widely adopted across quant-traders. Often includes option-implied volatility data to enhance model risk forecast.

The following models are available through Goldman Sachs:

	Market	Barra Model Code	Style Factors	Industry Factors (GICS based*)	Horizon Volatility Half-Life (days)
Global	Global Equities	GEMTLT - Stable	16	45	Long (252)
		GEMLTS - Responsive	16	45	Short (84)
GEMTRD - Trading		22	45	Trading (42)	
Global	Global Equities ESG	GEMLTESGL - Stable	17	45	Long (252)
		GEMLTESGS - Responsive	17	45	Short (84)
Regional	Europe	EULTL - Stable	18	29	Long (252)
		EULTS - Responsive	18	29	Short (84)
		EUTRD - Trading	24	29	Trading (42)
Regional	Asia Pacific	ASE2L - Long Horizon	30	51	Long (252)
		ASE2S - Short Horizon	30	51	Short (84)
		ASE2D - Daily Horizon	30	51	Trading (42)
Single Country	US Market	USSLOWL - Stable	16	60	Long (252)
		USSLWS - Responsive	16	60	Short (84)
		USMED - Medium	21	60	Mid (84)
		USFAST - Trading	24	60	Trading (42)
	China A	CNLTL - Stable	16	32	Long (252)
		CNLTS - Responsive	16	32	Short (84)
		CNTRD - Trading	20	32	Trading (42)
China International	CXE1L - Long Horizon	19	27	Long (252)	
	CXE1S - Short Horizon	19	27	Short (84)	
Japan	JPE4L - Long Horizon	20	43	Long (252)	
	JPE4S - Short Horizon	20	43	Short (84)	
UK Market	UKLTL - Stable	15	28	Long (252)	
	UKLTS - Responsive	15	28	Short (84)	

* In 1999, MSCI and S&P Dow Jones Indices developed the Global Industry Classification Standard (GICS), seeking to offer an efficient investment tool to capture the breadth, depth and evolution of industry sectors.

Disclosures

Goldman Sachs

© 2021 Goldman Sachs. All rights reserved. These materials are for informational purposes only and do not constitute an offer to sell, or the solicitation of an offer to buy, any security. The Goldman Sachs Marquee® platform is for institutional and professional clients only. Some of the services and products described in these materials may not be available in certain jurisdictions or to certain types of client. Please contact your Goldman Sachs sales representative with any questions. Nothing in these materials constitutes an offer, or an invitation to make an offer from Goldman Sachs to purchase or sell a product. These materials are given for purely indicative purposes and do not create any contractual relationship between you and Goldman Sachs. These materials are confidential and may not be disclosed to any third party (with the exception of external advisers on the condition that they themselves are bound by this confidentiality undertaking), or copied in whole or in part, without the prior written consent of Goldman Sachs. Any market information contained in these materials (including but not limited to pricing levels) is based on data available to Goldman Sachs at a given moment and may change from time to time. There is no representation that any transaction can or could have been effected on such terms or at such prices. Please see <https://www.goldmansachs.com/disclaimer/sec-div-disclaimers-for-electronic-comms.html> for additional information.

MSCI

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the “Information”) is the property of MSCI Inc. or its subsidiaries (collectively, “MSCI”), or MSCI’s licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the “Information Providers”) and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or redisseminated in whole or in part without prior written permission from MSCI.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION. Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors. None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy. It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, “Index Linked Investments”). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments. Index returns do not represent the results of actual trading of investable assets/securities. MSCI maintains and calculates indexes, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the index or Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance. Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research LLC and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.