

Introduction to Barclays QPS

The data-driven insights in our Systematic Fixed Income strategies are informed by systematic signals developed by the Barclays Quantitative Portfolio Strategy team, or QPS, which is well-recognized as an innovator in quantitative fixed income research. Their innovative signals and portfolio optimization methodologies form an important input to the process we, at State Street Global Advisors, use in the management of Systematic Active Fixed Income strategies. In this article, we explain who they are, how this collaboration came about, and why it is meaningful for our systematic strategies.

How the QPS Team Got Its Start

QPS was started in the late 1980s. The group helped launch several Fixed Income indices and related portfolio analytics that are broadly followed by investors today.

As QPS developed a deep understanding of index construction, investors began to turn to the group with questions on best practices in managing bond portfolios relative to benchmark indices, quantifying and optimizing risk, attributing performance to intentional and unintended index exposures, among other queries. By the early 1990s, the group was providing major institutional fixed income managers with research on a broad range of quantitative issues in fixed income portfolio management.

This continued to be the QPS group's focus for the next three decades. The group has been engaged in a research dialog with some of the largest investment managers in the world, including pension funds, Sovereign Wealth Funds, Hedge Funds, insurance companies, asset managers and central banks.

QPS publications tend to have a very long shelf life, as they are methodological in nature and not tied to current markets. Based on this work, the QPS group has also been consistently highly ranked in the Institutional Investor Fixed Income Research Survey (in 2022, QPS was ranked #1 in the US and Europe).

What QPS Research Has Taught the Market

Below, we dig deeper into some of QPS' innovative research, much of which has been transformative for fixed income traders and portfolio managers. These signals are delivered to State Street Global Advisors through custom systematic strategy indices that are used for our systematic active fixed income investing.

Duration Times Spread

In a study first published in 2005, QPS showed that spread duration (then the accepted measure of credit risk) was not optimal. QPS introduced a superior measure known as Duration Times Spread (DTS). In a series of research reports spanning over 15 years, the group has shown that credit spreads tend to move not in parallel (as implied by using spread duration) but rather proportionately — spread change is linearly proportional to spread level. A measure of sensitivity to such a proportional move is DTS. DTS has since been shown to give superior estimates of credit risk across a broad spectrum of credit assets (such as high yield, emerging markets, Euro sovereign debt), and across different market regimes. DTS has become a standard metric in institutional credit risk management.

Liquidity Cost Scores

In response to the Global Financial Crisis, in 2008, QPS launched bond-level Liquidity Cost Scores (LCS) based on quotes from Barclays trading desks and modeling of unquoted securities. Based on historical performance, LCS has been proven to reliably estimate transaction costs over time, as well as across different bonds at a given point in time.

Systematic Investing

QPS has researched and published extensively on systematic fixed income signals, especially in credit markets. In a recent book, *Systematic Investing in Credit* (Wiley, 2021), the group provides a high level overview of some of its signals and portfolio construction methodologies.

Over the past decade, QPS has broadened its focus to include cross-asset research and to integrate information based on signals beyond fixed income and across the full capital structure of an issuer. This has led to the development of several cross-market credit signals, some of which are being leveraged in State Street Global Advisors' systematic active fixed income strategies.

Environmental, Social and Governance¹

Using its cross-asset research capabilities, QPS has performed important research on quantifying the impact of a tilt in ESG scores (an issuer-level attribute) on performance and on valuation of fixed income portfolios. QPS has also provided insights into methodologies for isolating the ESG risk premium in credit and equity markets.

The Next Item on the QPS Agenda

State Street Global Advisors is excited to collaborate with QPS on research to support the development of Systematic Active Fixed Income Strategies. The first strategies introduced by State Street Global Advisors resulting from our collaboration address Investment Grade credit mandates, where three signals form inputs to the systematic process. In addition to the momentum, value and sentiment factors used in the initial collaboration, QPS is working on a broad spectrum of new strategies using novel data sets, natural language processing, extending equity market methodologies to credit, and developing best practices for signal combination and imposition of turnover constraints.

There is currently no globally accepted framework or definition (legal, regulatory or otherwise) of, nor market consensus as to what constitutes, an 'ESG', 'green', 'sustainable', 'climate-friendly' or an equivalent company, investment, strategy or consideration or what precise attributes are required to be eligible to be categorised by such terms. This means there are different ways to evaluate a company or an investment and so different values may be placed on certain ESG credentials as well as adverse ESG-related impacts of companies and ESG controversies. The evolving nature of ESG considerations, models and methodologies means it can be challenging to definitively and universally classify a company or investment under an ESG label and there may be areas where such companies and investments could improve or where adverse ESG-related impacts or ESG controversies exist. The evolving nature of sustainable finance related regulations and the development of jurisdiction-specific regulatory criteria also means that there is likely to be a degree of divergence as to the interpretation of such terms in the market. We expect industry guidance, market practice, and regulations in this field to continue to evolve. Any references to 'sustainable', 'sustainability', 'green', 'social', 'ESG', 'ESG considerations', 'ESG factors', 'ESG issues' or other similar or related terms in this document are as used in our public disclosures and not to any jurisdiction-specific regulatory definition or other interpretation of these terms unless specified otherwise.

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- Start with rigor
- Build from breadth
- Invest as stewards
- Invent the future

For four decades, these principles have helped us be the quiet power in a tumultuous investing world. Helping millions of people secure their financial futures. This takes each of our employees in 29 offices around the world, and a firm-wide conviction that we can always do it better. As a result, we are the world's fourth-largest asset manager* with US \$3.8 trillion[†] under our care.

* Pensions & Investments Research Center, as of December 31, 2022.

[†] This figure is presented as of June 30, 2023 and includes approximately \$63 billion USD of assets with respect to SPDR products for which State Street Global Advisors Funds Distributors, LLC (SSGA FD) acts solely as the marketing agent. SSGA FD and State Street Global Advisors are affiliated. Please note all AUM is unaudited.

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Past performance is not a reliable indicator of future performance.

Bonds generally present less short-term risk and volatility than stocks, but contain interest rate risk (as interest rates rise, bond prices usually fall); issuer default risk; issuer credit risk; liquidity risk; and inflation risk. These effects are usually pronounced for longer-term securities. Any fixed income security sold or redeemed prior to maturity may be subject to a substantial gain or loss.

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The returns on a portfolio of securities which exclude companies that do not meet the portfolio's specified ESG criteria may trail the returns on a portfolio of securities which include such companies. A portfolio's ESG criteria may result in the portfolio investing in industry sectors or securities which underperform the market as a whole.

Actively managed funds do not seek to replicate the performance of a specified index. The Strategy is actively managed and may underperform its benchmarks. An investment in the strategy is not appropriate for all investors and is not intended to be a complete

investment program. Investing in the strategy involves risks, including the risk that investors may receive little or no return on the investment or that investors may lose part or even all of the investment.

The value style of investing that emphasizes undervalued companies with characteristics for improved valuations, which may never improve and may actually have lower returns than other styles of investing or the overall stock market.

Equity securities may fluctuate in value and can decline significantly in response to the activities of individual companies and general market and economic conditions.

This document provides summary information regarding the Strategy. This document should be read in conjunction with the Strategy's Disclosure Document, which is available from SSGA. The Strategy Disclosure Document contains important information about the Strategy, including a description of a number of risks.

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