Systematic Fixed Income

BlackRock.

The next evolution in quantitative investing

Introduction

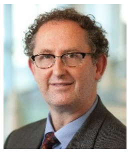
In 2018, quantitative-based investments surpassed USD $1 trillion in asset under management globally[1] – marking a major milestone for a once niche and unnoticed corner of financial markets.

Systematic investing, often regarded as a form of quantitative investing, is an investment approach that is growing in popularity and is being driven by the evolution in fixed income market structure, data, and technology.

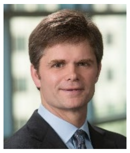
In this paper, we highlight and define the rapidly developing field of systematic fixed income investing, dispel common myths about the approach, and explain the unique value that it can offer investors given the confluence of market pressures they now face.

What is Systematic Fixed Income Investing?

Systematic fixed income strategies employ an objective, disciplined and repeatable process to identify, test, and implement investment ideas. Systematic approaches are driven by analytics and quantifiable insights, and encompass a range of investment options that are design to deliver specific outcomes and exposures to investors.



Tom Parker, CFA
Chief Investment Officer
Systematic Fixed Income



Matthew Tucker, CFA
Global Head of Strategy
Systematic Fixed Income

Tom's Take

As interest in quantitative investing has grown in the market we have seen the emergence of a true systematic category in fixed income.

While terms like "Big Data," "Machine Learning" and "Quantamental" have been in vogue to describe investment strategies in recent years, BlackRock has been at the forefront of quantitative investing in fixed income for nearly 30 years. We have been pioneers in systematic styles such as fixed income indexing, factor-based strategies, long-only active solutions and diversified, multi-strategy alternatives.

We believe our systematic approach to fixed income is unique because at its core it focuses on precise risk management, liquidity dynamics, scientific research, and a thorough understanding of what differentiates beta, factors and pure alpha returns sources.

Thomas Parker

Systematic fixed income investing employs an objective, disciplined and repeatable process to identify, test, and implement investment ideas.

Key advantages of a systematic active process are that it removes biases, has high breadth portfolios, and focuses on risk-adjusted return opportunities.

Systematic strategies can be used to target specific outcomes through beta, factor and alpha-seeking solutions.

[1] Source: Greenwich Associates, "The Benefits and Future of Quantitative Investing", May 17, 2018.

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Drivers of growth in systematic investing

Fixed income markets have undergone a transformation over the past decade. The rapid growth of data and analytics has provided portfolio managers with new tools for identifying and capturing investment opportunities. Investor attitudes have shifted as well, lower yields and muted long-term returns expectations are forcing them to reexamine their portfolios based on the value they receive for the fees they pay. At the same time, there is an emerging understanding of what constitutes alpha, beta, factors, and their relationship with each other in the equity markets has opened fixed income investors' eyes to new approaches to building investment solutions (see Figure 1).

Figure 1: Macro trends drive investors to risk-managed, low-cost solutions

Market themes driving adoption of quantitative strategies

Big data & technology
Increased availability of large and alternative datasets enable new approaches to finding market insights

Regulation & transparency
Increased disclosure of fees is making some investors re-evaluate the value-add of funds in their portfolios

Smart beta & factors
Greater awareness of return sources in portfolios may lead to a broader adoption of quantitative and rules-based investing

Long-term return expectations
Muted long-term return expectations and low yields are pushing some investors towards low cost investment strategies

Source: BlackRock. For illustrative purposes only and not meant to be a recommendation to buy or sell any security.

These developments have fundamentally altered fixed income markets, creating new opportunities for building fixed income solutions that seek to deliver more precise outcomes for investors.

The spectrum of systematic investment styles

Systematic investment approaches run the gamut of investment styles (see Figure 2), but are unified by a process that is grounded in scientific research, model-driven portfolio construction, and deep analysis of large sets of data.

Fixed income indexing is part of systematic investing as it follows a rules-based investment process and relies heavily on risk modeling. Most fixed income benchmarks cannot be fully replicated, necessitating a sophisticated index investment process that seeks to minimize tracking error and transaction costs.

Factor investing also relies on systematic techniques as it involves extensive research, data analysis, and market insight to create rules-based strategies that seek to capture broad and persistent sources of return.

In an ***actively-managed*** framework, a systematic process utilizes mathematical models and data analysis to identify investment opportunities. These opportunities are sized and combined into a portfolio according to a risk budget. Performance is then analyzed using a detailed attribution framework, enabling the manager to precisely identify what is, and what isn't working. This creates a feedback loop that informs future models and risk budgets.

Importantly, a systematic approach involves a deep understanding of what comprises and separates beta, factors, and alpha. This attribution allows the manager to properly identify opportunities and allocate risk as needed.

A wide range of strategies and data sets can be evaluated simultaneously. In fact, a systematic approach thrives on data, and does better in markets where information is readily available.

"...A systematic approach involves a deep understanding of what comprises and separates beta, factors, and alpha."

Figure 2: A spectrum of investment styles designed to seek specific outcomes

Different types of systematic investment styles and intended outcomes

	Index	Factors	Active	Alternatives	
β	Low-cost, market cap weighted exposure	Targeted exposure to broad and persistent sources of return	Benchmark-driven and managed to seek better risk-adjusted returns	Differentiated alpha-seeking strategies with low market correlation	α

Source: BlackRock. For illustrative purposes only and not meant to be a recommendation to buy or sell any security.

Data availability and potential alpha opportunity

A systematic alpha-seeking fixed income approach would have been extremely difficult to implement just a few decades ago, as there simply was not sufficient data available to build robust quantitative models. Today that has changed completely.

Every day tens of thousands of bond trades take place, allowing for the measurement of transaction costs and liquidity. There are millions of newspaper articles and research reports available electronically that provide sentiment information that can be extracted from natural language processing algorithms.

Exchange listed equities, futures and options create billions of ticks of data that can be researched with machine learning techniques and used to forecast price movements in less transparent fixed income assets.

Today, the availability of data is no longer a gating factor, but data does not create alpha. We believe alpha can only be created through a deep understanding of the data and how to utilize it to identify market opportunities.

Moving from "black box" to "glass box" investing

One common misconception of a quantitative approach is that it is a "black box," with high frequency trades being spit out by a completely autonomous machine that will eventually spell investment disaster.

In practice, fundamental and systematic approaches share many characteristics; however, they employ differentiated processes and techniques in pursuit of similar goals (see Figure 3).

> **"Quantitative models can be thought of as the quantification of human insights, they grow in sophistication and effectiveness as more is added to them."**

Investment professionals are a critical element to the systematic alpha process, but the role that they play differs from what it would be in a more traditional process.

In our vision of a systematic process, researchers and analysts transform raw data into useful information in order to find and evaluate insights. The top ideas are evaluated to see if they are sensible, predictive, consistent, and additive to the portfolio. If the idea fits all four criteria, it is built into an investment model and tested quantitatively through an academically-oriented process.

Model output is continuously reviewed and evaluated to identify out-of-model risk. Portfolio managers utilize optimization to combine models according to a risk model and budget. Detailed performance attribution then creates a feedback loop for evaluating insights and risk allocations, and identifying elements of the process that can be improved. In this way quantitative models can be thought of as the quantification of human insights, they grow in sophistication and effectiveness as more is added to them.

A clear example of this is the emergence of machine learning and natural language processing techniques. These approaches represent powerful new tools for quantitative investors to identify and capture market opportunities, enabling them to capitalize on subtle and complex relationships that may not be apparent in a traditional approach.

Figure 3: Parallel paths to the same goal

Overview of a Fundamental and Systematic investment process

		Fundamental	Systematic
Investment Approach	**Pursues alpha through**	Deep fundamental & macro analysis	Rigorous academic & scientific research
	Daily driver of portfolio	PM centric	Model-driven with PM oversight
	Trades primarily by	Applying market knowledge & experience	Analyzing available data & evidence
Analysis & Construction	**Investment tools used**	Meetings, checklists, due diligence	Risk models, backtests, regime analysis
	Primary form of analysis	Collective expertise, debate, & team consensus	Testing of model outputs
	Position sizing based on	Conviction	Optimization and risk-budgeting
Strategy Edge	**Core competency**	Depth of holding analysis	Breadth of holding analysis
	Alpha source	Short-term, idiosyncratic opportunities	Time-varying, repeatable insights
	Manages volatility through	Flexibility and adaptability	Defensive portfolio construction

Source: BlackRock. The above list is shown for illustrative purposes only, is subject to change and is not an exhaustive list. There may be other differences between investment approaches that are not detailed above.

A critical element of the systematic approach is that such insights are applied consistently through time, through markets, and across securities. Cognitive bias and mood swings are essentially removed. A model can improve through time as it is finely tuned and informed by ever more refined signals.

In addition, a model is not limited by the constraints of human attention and processing capability, it can monitor thousands of changes in fundamentals, prices, and market conditions a day. This creates breadth both in terms of the range of insights that can be incorporated into an investment decision, as well as the number of assets and investment decisions that a systematic process can support.

Systematic ≠ Quantamental

Importantly, systematic is different than what is sometimes referred to as a "quantamental" approach. The term quantamental is commonly used to describe a traditional manager employing quantitative techniques to analyze data or asses a market insight.

Such analysis is used either for a specific part of the manager's portfolio or to inform a fundamental investment decision. The overall investment process and approach is still driven by the portfolio management team, as they decide portfolio strategies and weights at their discretion, which could include down weighting or even completely ignoring the quantitative insights.

A truly systematic approach goes beyond just hiring a team of quants, it requires a completely consistent investment process. Systematic fixed income is systematic at all levels: research, risk budgeting, portfolio management, trading, and performance attribution.

The hard part: Implementation

The hurdle for most money managers is that success in systematic investing involves a combination of fixed income market expertise and a scientific investment process. There are many firms that have backgrounds as respected fixed income players. models in an efficient and effective manner. But historically quantitative investing has been a growth area primarily for the equity and alternative markets.

"We believe reducing this implementation friction *– the transfer coefficient –* is a critical aspect of success in systematic investing, and what separates the true experts from the data miners."

The skills and resources needed for a systematic fixed income strategy are very different than those traditionally employed by bond managers. Namely a focus on data and analytics, the ability to test insights, and an overall risk management framework. In particular, many managers lack the skills necessary to implement their models in an efficient and effective manner.

There are hundreds of alpha and factor strategies that appear in academic journals and manager presentations every year, and many of them appear to deliver some alpha or risk management insight. The reality is that the majority of them may not work in practice for a number of reasons:

- **High transaction costs** - Transaction costs and other implementation costs that will be incurred in implementing the desired strategy in the portfolio may not be properly measured or correctly anticipated.
- **Data reliability** – Many assume that bonds can always be traded where they are marked by a pricing service, which is not where they may ultimately trade, and not in the intended size or the intended time horizon.
- **Issue Availability –** Differences in an issuer's bonds across its capital structure are not always properly recognized.

These frictions together comprise the transfer coefficient, the gap between intention and realized performance. A robust systematic or factor process harnesses not only cutting-edge risk modeling, security modeling and data analytics, but also the talents of sophisticated investors who understand the real-world challenges that come with building portfolios and managing money. We believe reducing this implementation friction – the transfer coefficient - is a critical aspect of success in systematic investing, and what separates the true experts from the data miners.

Investment implications

As the risk and return components of fixed income markets are better understood, there may be significant implications for investors.

First, investors will have a much broader and clearer choice of investment options to choose from. Those favoring low-cost beta will be able to do so for an increasing number of markets. Those favoring factor investing will have an array of exposures available. And those preferring alpha-seeking strategies will have both traditional, as well as a growing number of systematic strategies to choose from.

> **“We believe those managers who have historically delivered beta or factors under the guise of generating alpha will likely find decreased investor demand.”**

Even more important than this choice of style will be an understanding of exactly what an investor is buying. This understanding is especially important for factor and alpha-seeking strategies where exposures will change through time. Investors may be able to tell how much of a strategy's return is attributable to beta, how much to factors, and how much to alpha, which will allow consumers to better evaluate and differentiate among the options available to them.

We believe those managers who have historically delivered beta or factors under the guise of generating alpha will likely find decreased investor demand. Those managers who can create true alpha may see asset growth.

Second, investors will be able to blend together combinations of beta, factor, and alpha-seeking exposures according to their investment objectives. There is no one best investment style or approach. Each has a range of trade-offs in terms of fees, risk and performance. Blending them together allows an investor to build portfolios more precisely and efficiently. Cheaply adding beta where it makes sense, tilting to factors in an effort to capture rewarded risk premia, seeking to add alpha to boost overall performance or mitigate risk.

Going forward, we expect to see growing demand for low-cost, risk-managed solutions across asset classes, in particular fixed income. Even in the event of a cyclical increase in interest rates, yields or realized bond returns, long-term return expectations for the asset class remains muted, creating continued pressure on fees. This pressure is compounded by the global move to fee-based platforms by wealth managers, as such an approach incentivizes advisors to seek out low-cost products.

Additionally, the increasing availability of low-cost beta and factor strategies creates cheaper alternatives for investors, increasing the pressure on fees for alpha-seeking products. This trend is reinforced by the growing availability of improved attribution tools that allow investors to better understand the differences between, and the relative merits of, alpha, beta, and factor strategies.

Bringing these themes together is the move towards model portfolios where institutions, home office platforms, and direct investor platforms demand low-cost, discrete exposure and risk building blocks that they can use in asset allocation models.

> **“Going forward, we expect to see growing demand for low-cost, risk-managed solutions across asset classes, in particular fixed income.”**

In such an environment, which is essentially one in which market forces are being brought to bear on those managing money in markets, we see tremendous potential for a systematic fixed income platform that fully defines and understands the relative contributions of beta, factors, and alpha, and can deliver each efficiently for investors.

Risks

Capital at risk. The value of investments and the income from them can fall as well as rise and are not guaranteed. The investor may not get back the amount originally invested.

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