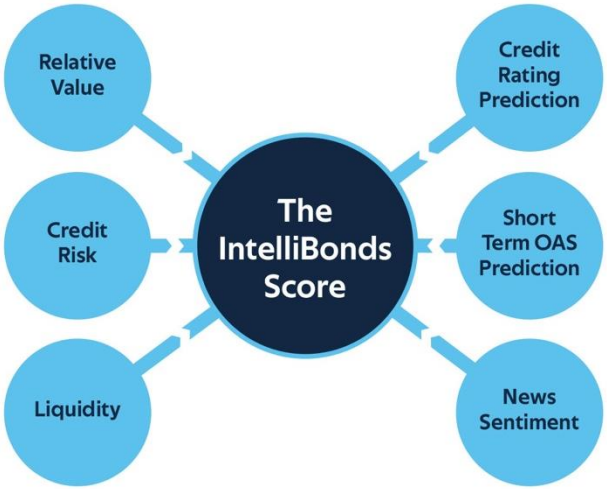
intellibonds

IntelliBonds bond scoring & portfolio construction engine

The Current Landscape

Traditionally, bonds are analysed through a labyrinth of spreadsheets which convolute data from many different sources.
As such, inefficiencies in data aggregation, standardization and processing lead to high costs and missed investment opportunities. Applying an algorithmic approach to the overarching analysis of these inefficiencies can improve outcomes substantially.



Overhauling Bond Analysis

The IB score composites six underlying factors and multiple subfactors, each constructed via a network of modern machine learning techniques. Deploying these six pillars through transparent, reliable, and easy to interpret top level factors allow users to rapidly gain complex insight into the otherwise opaque and scattered data sources. To that end, we are thrilled to breathe new life into the bond market in the form of IntelliBonds's AI-powered Bond scoring engine.

Alpha Generation:

Back-tests show considerable outperformance in terms of risk adjusted returns. The top 10% of Bonds ranked by IB-Score demonstrate vastly superior Sharpe ratios than respective benchmarks across USD, EUR and GBP for investment grade and high yield while having the same or better average credit rating.

Downside Protection:

Our credit rating prediction model correctly foresaw 84% of downgrades over the three year backtest window. Furthermore, our single factor backtest shows that company and industry sentiment scores effectively capture market dynamics changes, providing a further and valuable early warning signal.

Coverage and Relevance:

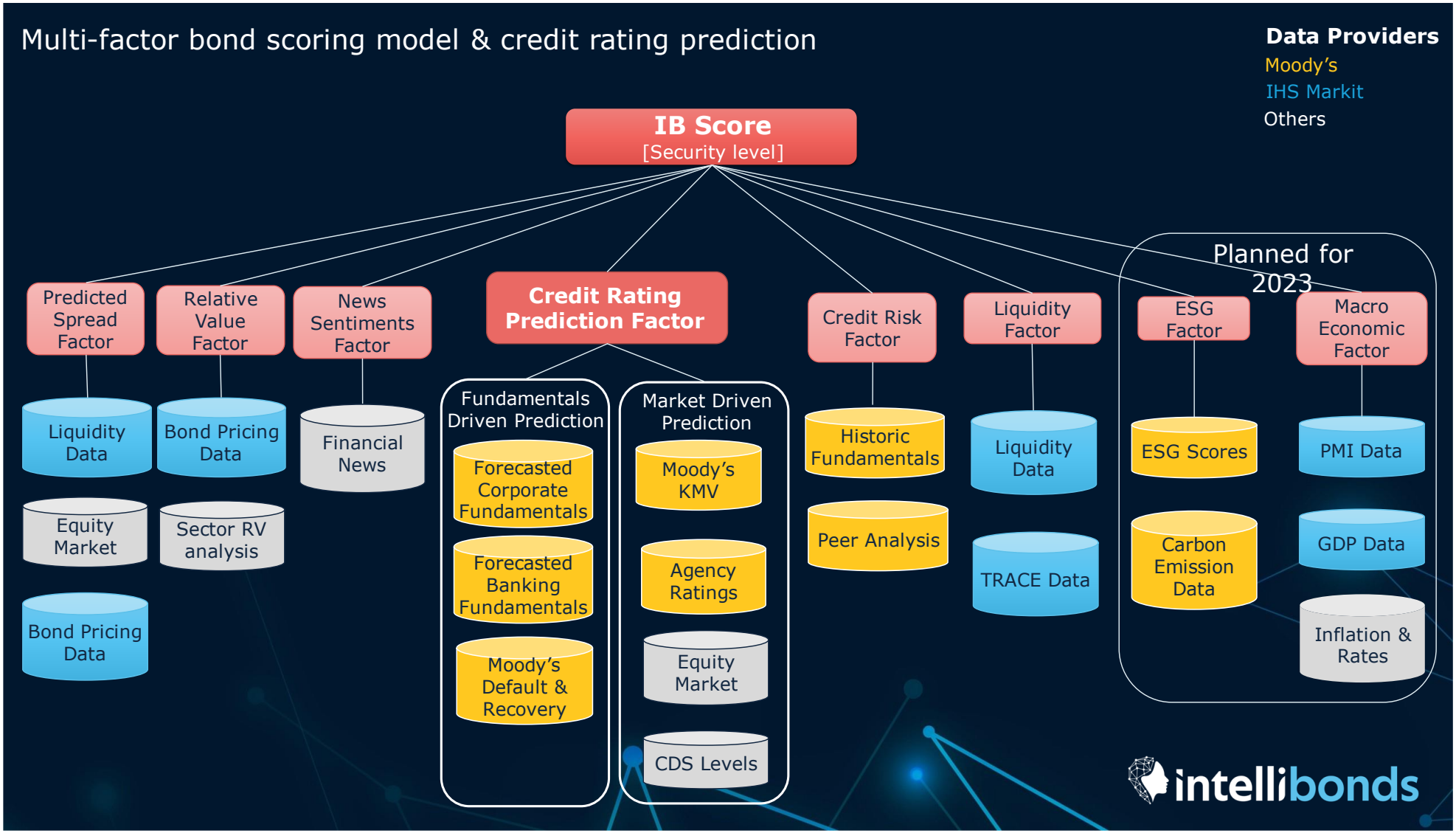
IntelliBonds employs data from tens of verified sources such as Moody's and IHS Markit. Each offers insight over differing time horizons and issuer universes to form detailed micro-founded insights. Existing data sets are further enhanced by your internal data and models customized based on your specific objectives.

Cost Reduction:

Data, system and labour optimization allows for time saving, efficient resource allocation as well as removal of low-value-added tasks.

The IntelliBonds Value Proposition

- Backtest results are indicative of the strong alpha predictive ability of the IB score.
- We allow for broader coverage and quick assessment of thousands of bonds at a glance without overwhelming the user.
- Our factors and subsequently the IB score are updated daily, thus removing the question on whether the existing analysis has become outdated or portfolio has unmonitored risks.
- Our platform allows analysts to reinforce or reconsider their beliefs surrounding certain bonds by comparing their own assessment with that of the models and share it in real-time with portfolio managers.
- The service doubles as a screening tool to prevent investors' focusing time and resources on analyzing objectively weaker bonds that could lead to losses for the client. This also serves as an excellent forward-looking risk management tool prior to portfolio construction or optimization.
- The IB platform can provide additional value to analysts or portfolio managers by allowing them to override key values and weights, to convert each user's own specialist knowledge into actionable insights. No Code collaborative interactions between investment professionals and AI models means bots get better at helping users with their workflow.


Multi-factor bond scoring model & credit rating prediction
Data Providers
Moody's
IHS Markit
Others
IB Score
[Security level]
Predicted Spread Factor
Relative Value Factor
News Sentiments Factor
Credit Rating Prediction Factor
Credit Risk Factor
Liquidity Factor
ESG Factor
Macro Economic Factor
Planned for 2023
Liquidity Data
Bond Pricing Data
Financial News
Equity Market
Sector RV analysis
Bond Pricing Data
Fundamentals Driven Prediction
Forecasted Corporate Fundamentals
Forecasted Banking Fundamentals
Moody's Default & Recovery
Market Driven Prediction
Moody's KMV
Agency Ratings
Equity Market
CDS Levels
Historic Fundamentals
Peer Analysis
Liquidity Data
TRACE Data
ESG Scores
Carbon Emission Data
PMI Data
GDP Data
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1. Credit Rating Prediction

What Expected trajectory of a given issuer's rating

How Two underlying sets of AI models: quarterly fundamental and daily Moody's CreditEdge default frequency with Equity market

Why This confluence of dataflows produces a responsive and yet farsighted summary of an issuer's future

Credit rating prediction captures the expected trajectory of a given issuer's rating and as such is distinct from our Credit Risk factor, which considers an issuer's present position.
Two underlying sets of models are employed to reliably forecast rating changes.

First, the model captures the analysis of quarterly fundamental data and Moody's analysts' adjustments. Second, it captures daily data from Moody's estimated default frequency, market implied ratings and equity market datasets. In both cases, custom machine learning approaches have been constructed to best extract and employ each data source's unique insight.

The result is a confluence of dataflows producing a responsive and yet farsighted summary of an issuer's future.

Once forecasted, the change in rating is then converted into our factor score. During the conversion, the certainty of the forecast, the relative distance between current and future ratings, as well as the significance of the change are all considered.

This results in a particularly insightful metric whereby an issuer expected to fall from investment grade, for example, can more easily be singled out from their peers long before markets start pricing in an actual downgrade.

2. Short Term OAS Prediction

What Provides insight into expected spread movement over the next month

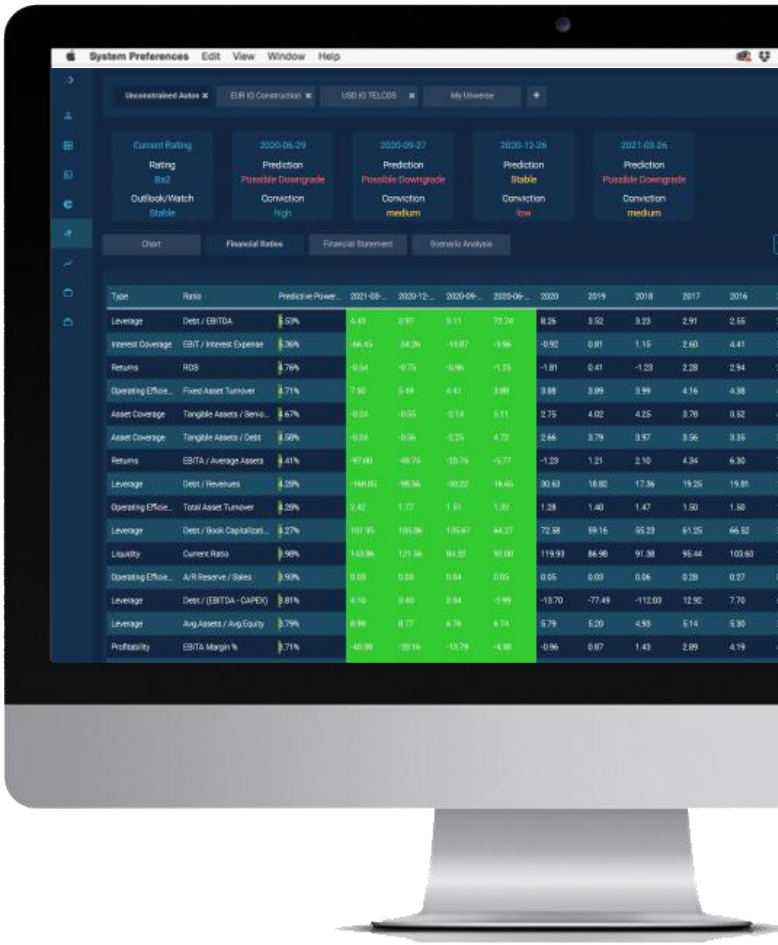
Why Signals returns and aids with timing of longer-term investment decisions

How A host of features and momentum indicators related to a bonds' peer groups are applied within a state-of-the-art deep learning algorithm to construct estimates for OAS

To provide insights into near term market movements, IntelliBonds' approach to OAS prediction considers a host of time series features as well as momentum indicators relating to specific aspects of a bonds' peer groups (e.g., sector, maturity, country, currency, and issuer). These features are used as inputs within a cutting-edge neural network frame to construct short term estimates for OAS.

As always, a factor score is then introduced to ensure our predictions are transparent and intuitive. With this in mind, the larger the expected OAS increase (decrease) the lower (higher) their score. Using this model in isolation, one would expect no/minimal short-term change in OAS for a bond scoring 5.0. From here, 10.0 and 0.0 represent the highest likelihood of spreads tightening and widening respectively.

We expect this factor to be particularly valuable for more active investors with total return objectives.



3. News Sentiment

Investor perception of an asset significantly influences its valuation; whether the herd is correct is not always relevant.

Consequently, betting against investors' sentiment is potentially costly. Since the turn of the century, advancements in natural language processing and the explosive growth in data arising from the integration of digital media into everyday life provides an opportunity for investors to take advantage of these directional biases. Thereby ensuring their investments are on the prosperous side of a sentiment driven market.

IntelliBonds embraces progress in all its forms and the developments in sentiment analysis are certainly no exception. Using a bottom-up approach, we employ granular metrics at the issuer level and aggregate issuer level sentiments to form cohesive opinions of industry wide sentiments.

A large amount of performance across the credit cycle can be attributed to sector allocation, which is crucial for constructing our overall IB score. The inclusion of both company and industry level sentiment provides a well-rounded consensus on investor sentiment.

4. Relative Value

Relative value aims to identify cheap and rich bonds relative to their peers.
Therefore, the logical first step, for every bond, is to identify its peers and thus enable like-for-like comparisons.

What	AI-augmented identification of cheap and rich bonds relative to their closest peers
Why	The size of a typical bond universe renders thorough relative analysis, a costly and time-consuming exercise mostly limited to a spread comparison
How	Carefully clustered peer groups based on a host of dynamically weighted features allow users to view relative value quickly and reliably against selected peer groups, assessing absolute spread levels, spread volatility and more not limiting the user to a single spread comparison

Given the size of the corporate universe, without the aid of computational tools this task would prove insurmountable.

Our peer groups are constructed using modern clustering methods concerning a bond's key features such as sector, rating, time to maturity and currency. Individual bonds are then assessed relative to their peers according to their spreads, associated spread volatility, Z-Score, Spread over Duration and other variables.

Here specific importance is placed on each factor depending on whether the bond in question belongs to the investment grade or high yield universes.

5. Credit Risk

What A more insightful and fine grain measure of credit risk over typical rating labels.

Why Traditional credit ratings are too coarse and do not provide sufficient dispersion within key rating buckets.

How The current rating and outlook is adjusted for IB's key credit metrics and the likelihood of a rating change based on IntelliBonds' Credit Rating Prediction score to form more granular assessment of the underlying credit quality.

Credit risk has historically been the key risk factor in the corporate bond space until the most recent decade where a surge of cheap central banks money across the globe meant credit risk was often ignored, leading to strong Credit performance of many weak companies and the survival of many zombie companies. This trend was only exaggerated by most recent Central banks corporate bond purchases triggered by Covid-19. In April the Bank for International Settlements stated that as a result of the Covid-19 shock, 50% of firms have insufficient cash flows to cover debt servicing and operating expenses over the coming year.

It therefore goes without saying that a transparent credit risk indicator is, now more so than ever, an essential part of the investor's toolkit. On this note, credit ratings alone are too coarse and do not provide sufficient dispersion within key rating buckets. For example, a rating that is up for review in the short term or shortlisted for consideration in the long term is clearly of interest, particularly if a change of rating is likely.

To make appropriate distinctions, alongside the current rating we account for the Moody's or analyst adjusted financial metrics to derive a composite score resulting in a more fine-grained measure of credit risk. At the same time downgrade risk and upgrade predictions are captured in the previously discussed Credit Rating Prediction score.

6. Liquidity

What	Overall bond liquidity measure
Why	Supports users by screening out largely illiquid bonds prior to portfolio optimization
How	We combine data on the bid-ask spread, depth of the book, previous trade counts and volumes to form one reliable metric for users to lean on

Highly liquid bonds typically trade with lower associated costs and thus liquidity provides a good proxy for transaction costs without referencing them explicitly. In addition, liquidity screening offers efficiency improvements since many bonds, although otherwise attractive, might be undesired due to being illiquid.

Therefore, our well-rounded bond level liquidity assessment avoids wasting both time and resources by conducting unactionable analysis or interactions. Through our liquidity score we combine data on the bid-ask spread, depth of dealer quotes on both sides of the book, as well as previous trade counts and volume across various time horizons.

7. The IB Score

To illustrate IB Score's predictive power, we compared the benchmark performance against the portfolios constructed purely based on the IB Score. For this purpose, we used six universes of liquid investment grade and high yield bonds across USD, EUR, and GBP currencies. Within each of these universes, we constructed the following two portfolios consisting of Bonds with the highest and lowest IB Scores.

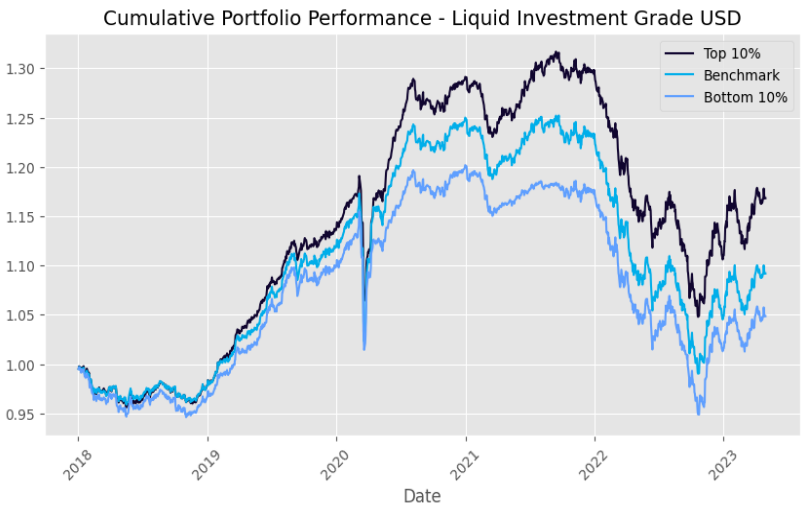
1. First portfolio comprised Bonds, which had IB scores in the top decile of the universe.

2. Second portfolio comprised Bonds, which had IB score in the bottom decile.

Over the backtest window, portfolios are rebalanced monthly and are transaction cost oblivious. As such, results are not interpreted as standalone investment strategies. Instead, they indicate the value held within the IB score in terms of the signalling power it places in credit analysts or portfolio managers' hands. We would generate custom back-tests based on the client's investment objectives, including transaction costs for actual portfolios.

Liquid Investment Grade – USD

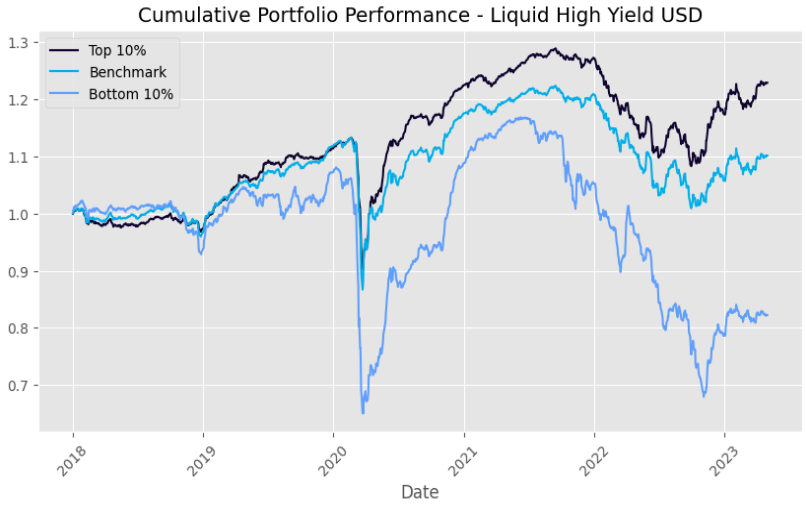
Primarily, the value of the IB score is twofold. On the one hand, we see that the score can identify the strongest bonds ahead of time, capturing excess returns. From a risk-return perspective, across all six universes, selecting the top 10% by IB score yields better risk-adjusted returns by Sharpe in all instances. On the other hand, the IB score acts as an invaluable early warning signal to indicate which bonds are likely to underperform, thereby providing substantial loss aversion.



	Top 10%	Benchmark	Bottom 10%
Ann. Return	3.26%	1.97%	1.21%
Ann. Volatility	5.77%	6.04%	5.86%
Ann. Sharpe	0.31	0.09	-0.04
Beta	0.93		0.95
Ann. Alpha	1.30%		-0.72%
Daily VaR95	0.57%	0.58%	0.56%
Average Rating	A3	A3	A3
Yield to Maturity	3.79%	3.42%	3.26%
Option Adjusted Spread	163bps	128bps	116bps
Option Adjusted Duration	7.5y	7.3y	7.1y
Option Adjusted Convexity	100	99	88
Duration-Times-Spread	1296	1056	927
No. of Issuers	237	926	211
No. of Securities	556	5562	556

Liquid High Yield – USD

For insight into the performance enhancement offered by each of the IB score's components, we also produce factor level backtests which are available on request. For example, the credit rating prediction alone provides excellent downside protection, best illustrated by its reliability throughout the recent pandemic. More specifically, out of 280 downgrades observed, our rating prediction model forecast 236 (84%) up to one year in advance, while for upgrades 187 out of 238 (79%) were correctly predicted. This encapsulates significant upside potential whilst simultaneously including strong downside protection within the overall IB score.



	Top 10%	Benchmark	Bottom 10%
Ann. Return	4.17%	2.15%	-2.75%
Ann. Volatility	5.62%	6.70%	11.39%
Ann. Sharpe	0.48	0.11	-0.37
Beta	0.77		1.40
Ann. Alpha	2.14%		-5.07%
Daily VaR95	0.44%	0.55%	0.85%
Average Rating	Ba2	B1	B2
Yield to Maturity	5.59%	6.69%	13.18%
Option Adjusted Spread	333bps	448bps	1108bps
Option Adjusted Duration	5.4y	4.4y	4.0y
Option Adjusted Convexity	22	-5	-0
Duration-Times-Spread	1779	1829	3491
No. of Issuers	72	690	79
No. of Securities	157	1570	157

8. Portfolio Construction & Optimization

What Provides functionality to construct or rebalance portfolios as well as AI-powered portfolio monitoring

Why Faster and better portfolio optimization allow for more time with clients and improves returns

How IB scoring engine combined with IMA constraints allows for a custom portfolio construction within a few clicks.

Unique constraints as per the investment management agreement are combined with IntelliBonds scores to create a pool of liquid securities that would most closely meet the client's risk and/or return objectives. A client can choose an investment strategy and define any custom portfolio conditions with no coding required. Once the investment strategy is selected, a client clicks on the optimize button. A custom portfolio gets created within a few minutes or trade ideas get suggested, factoring in turnover, transaction costs, and other constraints. A portfolio can be analysed using pivot-table functionality, saved and shared with other colleagues or further customizing of the output portfolio to achieve the desired outcome.

Final portfolio objectives and constraints are 'remembered' by the platform with algorithms generating trade ideas or credit risk alerts specific to the portfolio objectives. It allows portfolio managers to run multiple portfolios without the constant need for oversight of the actual holdings. Instead, portfolio managers could spend more time with the ultimate asset owners and provide further assistance with new requirements such as ESG-driven investment strategies a client may have or attract more assets.

Closing remarks

IntelliBonds' proprietary bond scoring engine offers a pioneering efficiency enhancement and alpha signalling toolkit for credit analysts and portfolio managers to streamline their workflow in the corporate bond space. For any additional information or to request a demo please contact us at Jimena.salas@intellibonds.com.

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