

March 2024

An introduction to Fidelity Optimus

Fidelity Systematic Investing



Marketing communication.
This material is for Investment Professionals only
and should not be relied upon by private investors.



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CELENT MODEL BUY SIDE AWARD 2024*
**Fidelity Optimus: Next generation
portfolio construction and management**

*The Celent Model Buy Side Award recognises best practice use of technology for portfolio management and trade execution within the institutional asset management industry.

Executive summary

Fidelity Optimus is a proprietary portfolio construction tool that allows the elegant incorporation of research insights into tailored fixed income investment mandates. It is the ideal platform from which to run customised solutions for our clients, as it has been designed with Fidelity proprietary fundamental, ESG, and quantitative research at its heart (across equity, credit, macro, and trading).

Ultimately, it is this research that has helped deliver strong performance for our clients over several decades. Combined with the skill and experience of our Systematic Portfolio Managers, Fidelity Optimus enables a wider range of clients to benefit from the advantages of our research via a broader range of solutions (including pension funds and insurance companies).

Fidelity Optimus: Key advantages

1. Customisation

Fidelity Optimus increases the potential for portfolio customisation, in consideration of specific constraints or preferences. All of the strategies listed have been created over the past six years and are widely available to clients.

2. Scope

Fidelity Optimus enhances each portfolio's potential functionality. For example, systematic fixed income mandates can now cover a wider range of asset classes, including sovereigns, index linked, global emerging market debt, covered bonds, high yield, and global investment grade. They can also implement a wider range of strategies, incorporating various quant models, multifactor credit optimisation goals, and sustainability criteria of varying degrees.

3. Precision

In-built portfolio management functions provide precise risk budget data and improve monitoring in relation to portfolio guideline limits. This increases portfolio efficiency in relation to transaction costs and turnover, while reducing error / omission risks.

4. Scalability

Fidelity Optimus ensures that our ability to provide bespoke investment solutions is scalable. The number of unique mandates we are running has more than doubled over the past three years.

Existing Fixed Income capability range

A wide range of solutions leveraging a consistent research platform to target specific outcomes.

Multi-Factor Credit Strategies

- Sustainable Global Corporate IG Strategy.
- Sustainable Global High Yield Strategy.
- Sustainable USD EM Strategy.
- Euro High Yield Strategy.
- Sustainable USD & EUR Corporate IG Strategy.

Simple Beta/Passive Strategies

- Global Government Climate Aware Strategy.
- UK Gilt Strategy.
- Sterling Corporate Bond Strategy.
- Global Government Bond Strategy.

Buy & Maintain Strategies

- Fixed Maturity Strategy (USD, SGD, YEN, EUR).
- Evergreen Target Yield Strategy.
- High Quality Bond Strategy.

LDI Strategies

- Liability Matching Investing Strategy using Government & Inflation linked Bonds.
- Cash Flow Matching Credit Strategy.
- Solvency Optimized Strategy.

Source: Fidelity International, 31 December 2023.

Fidelity Optimus: An integrated portfolio management system

“Fidelity Optimus is a next-gen platform for portfolio construction, modelling and the implementation of tailored investment solutions. It is a cornerstone of asset management’s digital transformation.”



Lucette Yvernault

Head of Systematic Fixed Income
Fidelity International

No longer are bespoke fixed income solutions only accessible to the largest pension schemes. We have designed our proprietary Fidelity Optimus technology system as a versatile straight-through processing tool that harnesses the computational power of cloud computing to incorporate proprietary insights from Fidelity active research and client-defined objectives / constraints within tailored investment portfolios. It can create portfolios with diverse characteristics and goals for a range of clients, from institutional mandates to insurance solutions or cost-effective sustainable ETFs. Scalability is one of its major benefits.

Fidelity Optimus operates through a wide array of pre-set optimisation algorithms, ranging from our award-winning proprietary multifactor model to more passive stratification

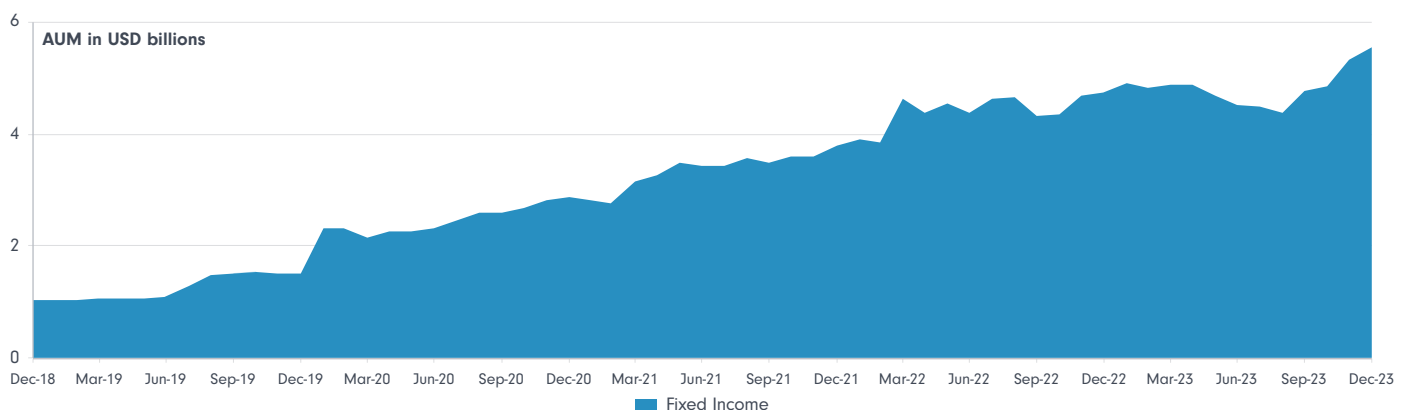
and liability-aware/curve matching models. Its functionality includes the storing of evolutive risk budget and liability cashflow profiles, the selection of bespoke client-defined investable universes, and the implementation of customised ESG filters. It can adjust portfolio constraints relating to diversification or liquidity through time, simulate and analyse portfolio acquisitions or rebalancings, and even provide comprehensive assessments of deployment risk and turnover/costs.

Fidelity Optimus provides our portfolio managers with a detailed summary of in-depth portfolio characteristics, including all main sources of active risk and tracking error. It includes all holdings and breaks down contributions from principal term structure components: interest rate, curve, credit, and currency risks. It can show rate sensitivity in either real (inflation linked instruments) or nominal (conventional bonds) terms, and also convexity.

Risks and portfolio characteristics can be broken down and optimised simultaneously, whether relating to credit rating, industrial sector, ESG rating, carbon emissions / environmental contributions, regulatory scores, accounting constraints, or turnover implications. As new trade ideas are communicated by our research teams, potential transactions can also be simulated and costed.

“We are unaware of any commercial software with equivalent functionality.”

Fidelity systematic fixed income AUM

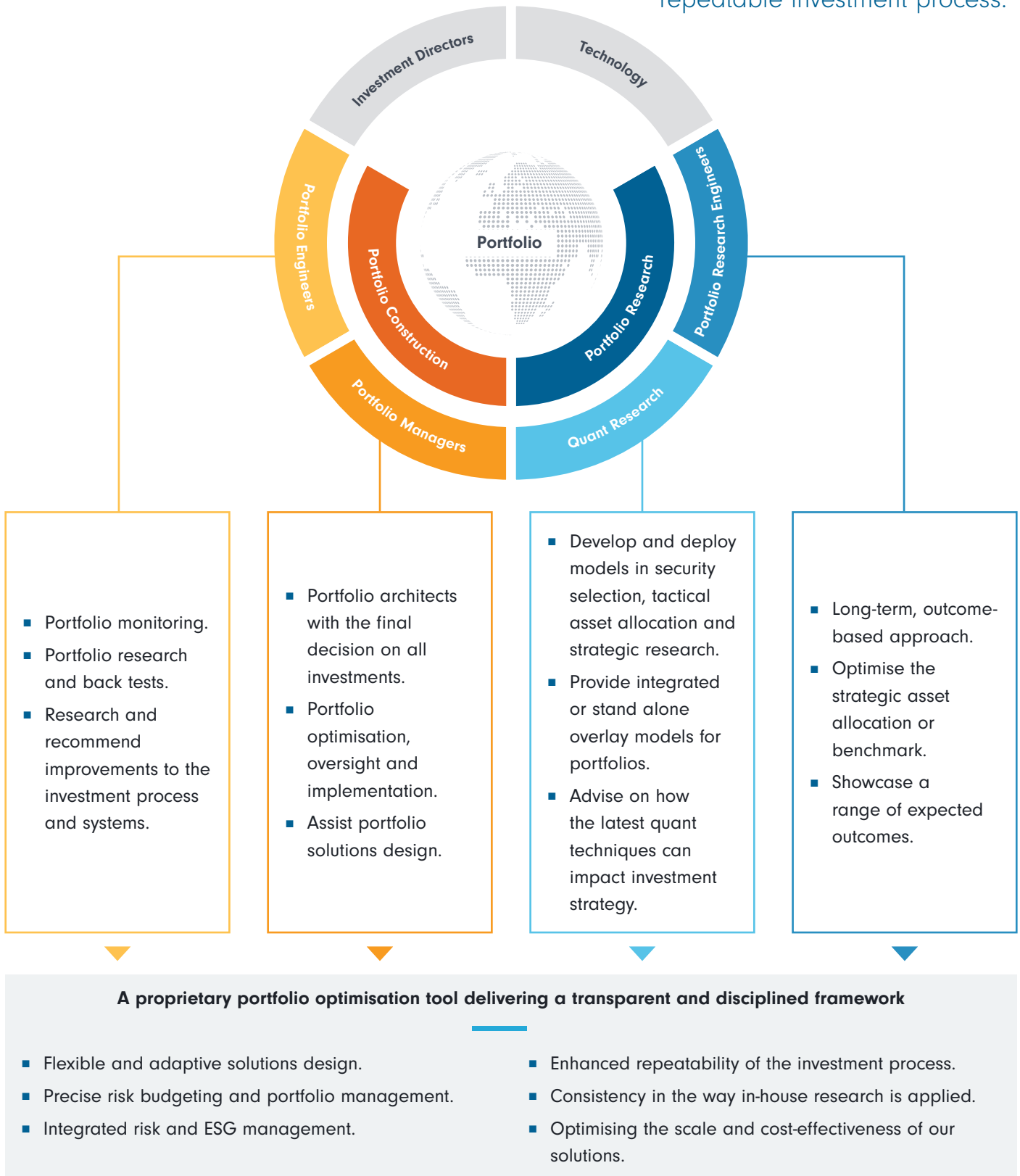


Source: Fidelity International, 31 December 2023. Totals may not sum up due to rounding off. This AUM chart does not include advisory mandates’ AUM of USD c. 240m (as of December 2023).

Fidelity Optimus: A team-based approach

“Fidelity Optimus is the result of collaboration between solutions design and portfolio management.”

“We partner with clients and their consultants and to deliver their objectives through a disciplined, repeatable investment process.”



Source: Fidelity International, March 2024.

Underlying technology

Holistic straight-through deployment of the investment process

Fidelity's systematic fixed income portfolio managers use Fidelity Optimus to apply a disciplined, prudent and replicable approach to investment and portfolio construction:

1. Review the investment universe

Taking portfolio objectives like quality, volatility and desired exposure restrictions such as minimum rating, country, currency, maturity, sector, ESG criteria, etc. into account.

This step screens the fundamental creditworthiness of bond issuers within the universe based on static characteristics, including Fidelity credit and quantitative research and data provided by external rating agency ratings (S&Ps, Moody's, Fitch's and MSCI for ESG).

2. Apply proprietary Fidelity research inputs

This step narrows the investment universe to investments that our proprietary research indicates have a positive or at least a stable trajectory. It takes several criteria into account, including the assessments of our fundamental analysts in credit (fundamental, outlook and relative value), equity (when relevant), forward-looking ESG factors (including the results of corporate engagement), and liquidity, etc. It allows portfolios to enhance the predictability of cash-flow repayments by filtering out unfavourable investments. It also helps to reduce portfolio turnover.

3. Adopt an appropriate risk budget

Risk budgeting is deployed according to the four dimensions of any fixed income portfolio: credit risk, interest rate sensitivity, term structure and currency. Strict limits are defined in absolute or benchmark-relative terms, based on the client's investment guidelines and Fidelity's prudent risk framework.

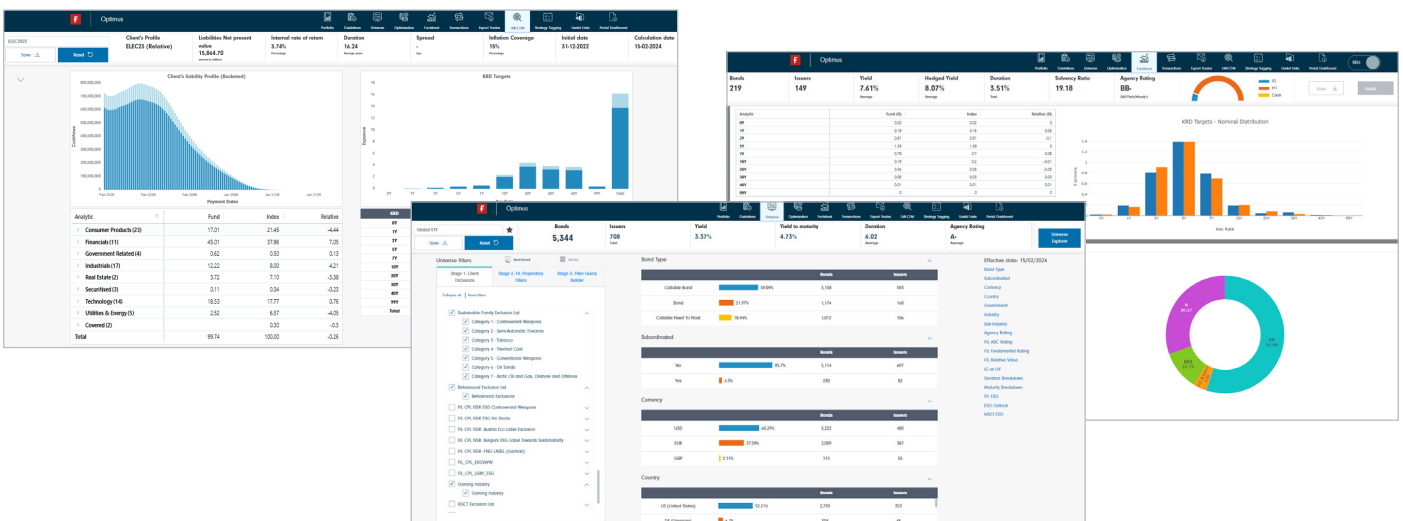
This step creates an additional set of constraints for prudent portfolio construction. Input from our systematic portfolio managers is important, as this adds constraints that ensure portfolios are implementable (maximum DTS by issuer, minimum number of issuers, liquidity etc.). These will also be evolved by the portfolio managers over time.

4. Optimisation

Brings together these target objectives and constraints to construct a diversified investable portfolio. The output is set of trades for specific instruments to be purchased and/or sold. Before implementation, output is reviewed and adjusted (if necessary) the portfolio managers.

5. Review of the proposed solution

The portfolio managers review the strategy before confirming of a final set of orders that are transitioned to our trading system for final top-down compliance validation and implementation.



Modelling language

We chose the CVXPY package, as it facilitates mathematical translation and provides an interface with third-party solvers. This is a Python-embedded modelling language for convex optimisation problems that supports the wide range of constraint and objective specifications required in our portfolio optimisations.

CVXPY is based on CVX, a MATLAB-based modelling system for convex optimisation. It automatically transforms problems into standard form, calls a solver, and unpacks the results. It allows users to express problems in a natural way that follows maths, rather than in the restrictive standard form required by solvers. It also transforms user-described objective functions and constraints into a canonical form that can be consumed by downstream optimisation solvers.

Data sources

Fidelity Optimus enhances the impact of the mathematical model on overall alpha generation. It does not process/download or optimise any capital-market forecasts, analyst fundamental projections, or subjective views of the speed of spread compression or market unwinds. It relies exclusively on:

1. Fundamental inputs sourced internally among Fidelity's fixed income, equity & sustainable research teams.
2. Our proprietary multifactor model, which provides an independent quantitative assessment of fundamental, sentiment and valuation rankings for every company within a given sector.
3. Internal analytical data, which is processed almost exclusively via independent software.
4. External static data, including rating-agency information (also ensures that solutions remain in compliance with their investment guidelines).
5. Portfolio and trading data, which ensures that portfolios and activity are accurately represented.

Integration of sustainability data and new regulatory models

With ESG and sustainability moving to the forefront of investor thinking, Fidelity Optimus can access Fidelity's proprietary forward-looking ESG Ratings and third-party ratings from issuers like MSCI.

For example, for fixed income instruments Fidelity Optimus can map ESG ratings attached to a reference security in the equity market. Using the same company tree, every

bond is allocated carbon emission and environmental impact statistics, such as weighted average carbon intensity (WACI) data. This can then be used to monitor the aggregated carbon footprints of portfolios predominantly invested in corporate debt.

By absorbing and maintaining these datasets at a consistent quality, Fidelity Optimus is creating a library that gauges the ESG evolution of most borrowers around the world. In recent years, the quality and reliability of this library has allowed the formation of our sustainable solutions of different levels.

The combination of multiple information sources with varied time horizons supports the creation of more sturdy solutions for clients. This includes in consideration of:

- The requirement to avoid exposures to companies that are likely to generate negative headlines.
- To demonstrate the ability and willingness of building more sustainable futures to stakeholders and regulators.

Governance and implementation risk considerations

A. Calibration and optimisations

Optimisations generate proposed portfolios via a robust process that uses predefined templates that consider the reference benchmark, guideline constraints, dynamic constraints, risk budget constraints, and the target Liability Driven Investment profile (if applicable). These templates are validated by portfolio managers. Over time, market developments can trigger recalibrations of template constraints.

B. Transparent Model Development and upgrades

A robust implementation process is followed for updates and new developments. Updates are validated for concept and if any mathematical formulas are involved, these are validated by our quantitative research team. Portfolio construction risk analysts or members of the Portfolio and Research Engineering Group provide a further independent check.

All tasks are developed and tested in the developer's environment and do not progress further until they are free of apparent malfunction. Each developer works in tandem with a colleague to ensure that code semantics are fit for purpose, the architecture of the software retains its integrity, and regression test results retain the same values.

Before release, each update or new development is subject to independent checks. At no point before or during production would any engineer be entitled to

access the actual code. Lead portfolio managers do not have access to the code and are never in control of testing or deployment.

C. Preserving the independence of the production code

The Systematic Investing Team does not have access to Fidelity Optimus's live or development code. Likewise, none of their code is deployed in production. Every concept is documented and stored internally.

D. Independent model risk review and audit

Semi-annual model risk reviews and internal and independent technology audits provide additional vulnerability checks that safeguard the model's security. Regular internal audit recommendations are incorporated into Fidelity Optimus to enhance the segregation of data and access to live portfolio information. To mitigate contagion risk, the modelling of external client portfolios is segregated from the storage of live strategies.

Deployment, regression and backtesting

We conduct extensive validation procedures to ensure that Fidelity Optimus delivers the correct outputs when passed defined inputs. These regression tests are undertaken whenever we release software updates.

The optimisation process is run using a proprietary Python module, which relies on the external library (i.e., a modelling language) for core optimisation routines. This library is widely utilised in the investment industry and integrates well with the target functions we have deployed in production. It is reliable and has provided repeatable results throughout all our comprehensive regression testing and back-tests. The regression suite is continuously enhanced to incorporate progressive scenarios.

Excellence through collaboration and challenges of the deployment

Ideation, conceptualisation, documentation, and deployment of updates and new developments has occurred at a rapid rate through the bi-weekly release of new versions of the software. This is made possible by agile collaboration between various teams across our business, including technology, investment, quant modelling, portfolio risk monitoring, compliance, first line risk, and risk model policy. Bi-weekly sprint cycles include automation of regression testing and successive deployments in four testing environments before release in production.

State-of-the-art deployment relies upon:

- Innovative and modular functions; outstanding testing/troubleshooting processes, and spectacular documentation.
- Unprecedented cross-departmental collaboration, radical adoption of novel technologies, and rigorous quality control.
- Predictable outcomes (an experienced portfolio manager should recognise the justification of solutions as they are delivered).

Limitations and risk

While Fidelity Optimus is able to provide reliable and predictable portfolio optimisations, limitations include:

- Lower discretion in the portfolio management decision making process due to some reliance on model outputs. However, this is mitigated by portfolio engineer and portfolio manager oversight of final investment decisions.
- Investment risks associated with the underlying strategy still apply. As such, the value of investments and the income from them can go down as well as up and investors may not get back the amount invested. The tool does not offer any guarantee or protection with respect to return, capital preservation, stable net asset value or volatility.



Case studies

Case study 1: Insurance clients

Leveraging decades of experience managing liability-relative portfolios across multiple jurisdictions, we ensure that insurance solutions are robust and theoretically sound, considering implementation constraints and prevailing market conditions.

Regulation is an increasing focus for the insurance sector given the many new requirements around solvency, sustainable investing, and reporting. We engage frequently with regulators to track policy changes, which helps guide process enhancements. Fidelity Optimus therefore has the capacity to integrate ESG across the investment process alongside our proprietary bottom-up fundamental research. This means that each client's financial and non-financial (e.g. environmental, social and climate impact) risk budgets can be optimised simultaneously.

Our tailored solutions for insurers cover a range of durations, portfolio characteristics and liability structures, including:

- Real and nominal liability matching for cash flows across multiple currencies, with caps and floors.
- Solvency II, Risk Based Capital, IFDR, EIOPA-aware investment strategy design.
- Various liability-discount approaches.
- Strategies with allocation constraints relating to growth assets.
- Liability-matching asset strategies, ranging from interest rate and inflation swaps to government and corporate bonds.

Liability matching strategies are built into Fidelity Optimus by transforming the client's liability profile to a key rate duration profile for liability driven management. For cash flow matching strategies, Fidelity Optimus sets cash targets and acceptable mismatches for various duration buckets within the overall profile.

Fidelity Optimus can also assist with buy and maintain solutions by:

- Monitoring Fidelity proprietary ESG Ratings, which are based primarily on ongoing structured corporate engagement activity.
- Monitoring the quality of debt instruments and limiting credit downgrades.
- Undertaking management of cashflow and liquidity risks.
- Monitoring interest rate sensitivity mismatches and the convexity impact of significant market and curve movements.
- Enhancing the diversification of sector and country exposures.

Insurance development in the Asian market and the need for more precise regulatory & ESG positioning using Fidelity Optimus
<https://www.fidelity.lu/articles/analysis-and-research/2023-07-31-asias-changing-insurance-regulatory-landscape-1690788549008>

Insurance competition in Europe and the race to net zero: Fidelity Optimus is supporting the construction and maintenance of Paris Aligned SFDR article 9(3) public and segregated strategies
<https://www.fidelity.lu/static/master/media/pdf/download-material/FIL-Race-to-NZ-Decarbonising-fixed-income-portfolio.pdf>

Case study 2: Multifactor deployment

Fidelity's Multifactor approach

Award-winning approach to systematic credit investing

What is multifactor investing?

- Aims to outperform a comparative index while preserving the core characteristics of the asset class.
- Designed to deliver excess returns by investing based on quantitative signals (factors) proven to identify issuers that outperform under strict consideration of transaction costs.
- Our model constructs a Credit Factor score for each issuer based on a quantitative assessment of:
 - Fundamental quality,
 - Valuations, and
 - Sentiment.
- Aims to invest in sustainable high yield bond exposure and reduced climate risk.

Benefits

- Active **credit** exposure with a consistent risk profile.
- Clear sources of risk and return.
- Robust **ESG and climate framework**.

Why Fidelity?

- Fidelity credit and sustainability research ratings.
- Proprietary set of internal and external data.
- Flexibly weights factors.
- Realistic trading cost penalties.

Past performance is not a reliable indicator of future results.

Source: Fidelity International, January 2024. The third party mark appearing in this material is the property of the respective owner and not by Fidelity.

European Pensions

AWARDS 2020

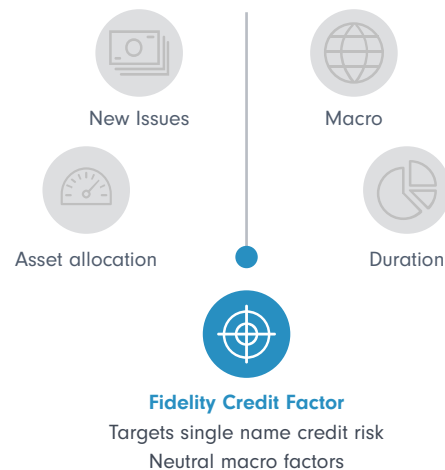
WINNER

Factor Investing Offering of the Year



Return driver

Multifactor Credit portfolios systematically isolate credit excess returns through our proprietary factor model



Our multifactor model seeks to reduce portfolio downside risk and deliver excess returns from an investable universe of issuers. To accomplish this, a credit factor score is constructed for each issuer in the universe. The bonds of each issuer are then distinguished via the attribution of three further ratings:

- Roll down - yield from holding a bond over a year assuming it does not move on the yield curve.
- Residual - valuation relative to the issuer's credit spread curve.
- Transaction cost - transaction costs can change with market conditions and liquidity regimes, but estimate accuracy is improved by calibrating our model using data from actual bond trades. Consideration of transaction costs can help provide more stable return profiles by allowing efficient implementation of our fundamental research over time. In practice, portfolio managers work closely with dedicated traders to implement portfolios achieve best execution and limit turnover costs.

These processes take data from over 80 sources and convert them into factor signals (fundamental, valuation and sentiment) to rank issuers. Our research shows that different factors perform in different ways across various stages of the economic cycle, so factor weights are adjusted during portfolio construction to maximise expected risk-adjusted return by optimising exposure to:

- Issuers with the best credit factors.
- Bonds with the most attractive valuations.

The outcome is a strategy that generates alpha from credit selection, itself based on the multifactor model and sustainability assessments, while also providing macro level exposures in line with the index.

Multifactor Credit Customised Solutions

[A bottom-up approach to factor investing in corporate bonds \(fidelityinternational.com\)](https://www.fidelity.com/learning-center/insights/multifactor-credit-customised-solutions)

Multifactor Credit Model

<https://video.fidelity.tv/view/6ly9TRXFY5>

Fidelity Optimus helps investors hedge against the possibility that duration exposures do not behave as expected.

<https://www.fidelity.lu/static/master/media/pdf/download-material/FIL-Focus-on-FI-Portfolio-construction-in-a-paradigm-shift.pdf>

Case Study 3: ETF management and flows

ETFs are a growing segment of our systematic business, with roughly a quarter (as of 31 December 2023) of our AUM held across various ETFs and four new ICAV ETFs launched in 2023.

There are two types of ETF flows:

- Monthly rebalancings of underlying securities.
- Daily inflows or outflows from Authorised Participants (APs) creating or redeeming shares.

Most monthly rebalancings utilise our multifactor model, as described in Case Study 2.

For daily inflows or outflows, most APs prefer to create or redeem from the fund using an inventory management mechanism, which involves engaging with our portfolio managers to negotiate baskets of securities that will satisfy flow volumes.

APs are aware of the securities present in each fund at the start of the day and their concentration, so for share creation they can often offer a quasi-matching inventory of securities from their own books. Multifactor optimisation is then set to absorb a large volume of the securities proposed by the APs without deviating from its best-in-class factor optimisation output, suggesting orders which are then sent to the AP for review and final validation. Only when the basket of securities has been approved by both the AP and our ETF portfolio managers will it be forwarded to our trading desk to acquire the price for each transaction.

This basket negotiation process is preponderant in the ETF fixed income market, where security minimum denominations are often a penalty on creating a clean slice of the fund for every flow. However, Fidelity Optimus acts as a smart and scalable platform that can absorb multiple flows daily, undertaking intraday optimisations that consider previous orders generated that day.

The investment platform also conditions negotiated baskets to lend with a dedicated price provider, accompanied by its unique custodian identifier and the appropriate MIFID reporting.

ETFs offer in-kind settlement of subscriptions and redemptions, which promotes lower transaction costs.

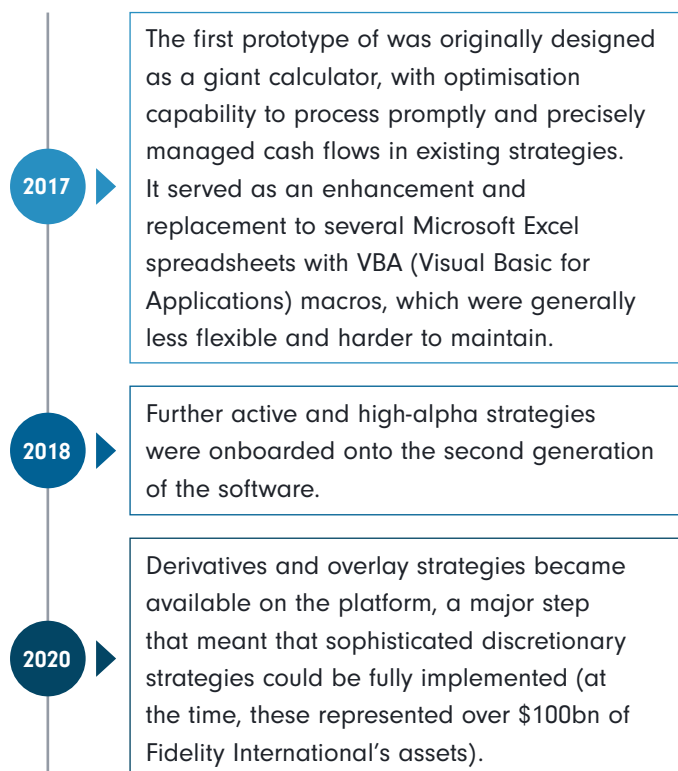
<https://video.fidelity.tv/view/ZLdD0DEEisrx0dytr9Pg6a?captions=en>

The genesis of Fidelity Optimus

Fixed income investment has become more complex as investors have to come to terms with challenging market factors like rising interest rates and increasing regulatory constraints. Clients like pension schemes now need to balance liabilities with covenant constraints, as well as other objectives such as adherence to evolving sustainability criteria. As an example of the latter, SFDR is incentivising asset managers to present the sustainability characteristics of their portfolios in a consistent framework and United Nations Principles for Responsible Investment signatories will need to disclose additional emission statistics for each of their strategies from next year.

Fidelity set out to meet this increased and evolving complexity with an efficient, scalable proprietary technology platform, 'Fidelity Optimus', deployed for use in 2017. This accompanies investment professionals by undertaking repeatable processes that assist in the delivery of risk-managed portfolios. It is the fruit of cross-divisional partnership and continuous development between several functions across Fidelity.

Key milestones



Recent advancements

- The launch of the ETF franchise and the processing of fixed income negotiated baskets.
- Deployment of a fixed income multifactor model in Amazon Web Services (AWS). Upgrading the analytic service engine to run on AWS multi-instance cloud processing improves computation and reduces API request latency. The enhances scalability and has reduced Fidelity Optimus's carbon footprint, while deployment, processing and regression testing times are also shortened.
- More integrated access to Fidelity proprietary research, third-party research, agency ratings data, and Bloomberg data.
- Deployment of state-of-the-art sustainability, decarbonisation, and other climate-controlled strategies.
- SFDR-aligned positioning simulation and monitoring.
- Deeper integration with Fidelity's compliance and reporting platforms, and overall company risk framework.
- Angular dedicated user interface service with back-end processing for multi-portfolio analysis.

Future developments

As of March 2023, the development pipeline includes:

- Risk-based capital optimisation to help insurance companies fulfil their financial obligations to policyholders.
- Onboarding of data and analytics relating to private credit and direct lending.
- Wider scope of available information from quantitative models, e.g. liquidity indicators. For example, we recently have partnered with FactSet to acquire additional indicators, fundamentals, and other issuer and security data. We have also enriched our set of sustainability indicators including climate ratings and Sustainable Development Goals (SDG) alignment indicators.

Further information

Insurance and Pension customised solutions.

<https://video.fidelity.tv/view/aHjokK4yWDb>

Insurance development in the Asian market and the need for more precise regulatory & ESG positioning using Fidelity Optimus.

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<https://www.fidelity.lu/static/master/media/pdf/download-material/FIL-Race-to-NZ-Decarbonising-fixed-income-portfolio.pdf>

Multifactor Credit Customised Solutions.

<https://video.fidelity.tv/view/6lyl9TRXfY5>

Multifactor Credit Model.

<https://video.fidelity.tv/view/6lyl9TRXfY5>

Fidelity ETFs: Best-in-class asset allocation building blocks.

<https://video.fidelity.tv/view/ZLdD0DEEisrx0dytr9Pg6a?captions=en>

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<https://www.fidelity.lu/static/master/media/pdf/download-material/FIL-Focus-on-FI-Portfolio-construction-in-a-paradigm-shift.pdf>

Fidelity Systematic Investing.

<https://video.fidelity.tv/view/WGE6GShMgJa>

Sustainability across Fidelity Systematic Investing.

<https://video.fidelity.tv/view/o6n7NaAjr19>

Appendix: Fidelity Optimus characteristics

Key functionalities

- An open-architecture optimiser customised to perform portfolio construction processes with input from Fidelity's proprietary Multifactor model.
- Efficient cash flow management and rebalancing, including intraday positioning and index positioning.
- Asset and liability analysis, including curve and cash flow mismatch tracking.
- Multifactor and liability matching / yield enhancement across fixed maturity and cash flows, including risk budget enhancements and optimisations.
- Monitoring of realised P&L room for regulatory dimensions (SCR score, matching adjustment compatibility, risk-weighted asset score, weighted average rating factor).
- Advanced scenario analysis and transaction cost modelling to control turnover.
- Monitoring of pre/post compliance rules against portfolio limits.
- Full digital transfer of trade orders to compliance / trading platforms.
- Fully integrated within liquidity risk platform and Sustainable Finance Disclosures Regulation (SFDR) EET monitoring.
- Flexible risk budget evolution through the economic cycle.
- Fully integrated price acquisition and basket processing.

Key benefits

1. **Predictable outcomes:** An experienced portfolio manager should recognise why the instruments are part of the suggested solution.
2. **Reliable:** Portfolio construction should always deliver the exact same solution under regression testing.
3. **Replicable:** The same outcome should be available within or outside the software, given the same initial portfolio, universe of investment, turnover constraints, and an identical target function.
4. **Calibrated:** To avoid unnecessary churning and transaction costs.
5. **Flexible:** The number of risk budget and guidelines constraints, and the type of constraints, will differ depending on the solution. Various target functions will nuance the number of instruments in the final solution and finesse the quality of the solution.
6. **Agnostic:** Does not project its own market scenarios or become path dependant.
7. **Consistent:** Should produce a prudent portfolio positioning, no matter the past date being considered.
8. **Compliant:** Solutions compliant with every single constraint, or the optimiser should indicate that no solution is possible.

Optimisation targets

Fidelity Optimus translates human-understandable portfolio specifications to a set of mathematical constraints and an objective function that can be maximised or minimised. Optimisation objectives depend on the nature of the client's mandate and the precision of the solution. Ten functions are available with targets:

1. **Maximise Yield to Maturity** for single currency or buy and maintain solutions.
2. **Maximise Hedged Yield** for hedged-to-term or multi-currency buy-and-maintain solutions.
3. **Maximise Average Rating** for high-quality solutions.
4. **Maximise Weight Diversification** for custom-made diversified index creation.
5. **Maximise Government OAS** for conventional sovereign solutions.
6. **Minimise the Sum of squared Cash Flow differences** for cashflow profile matching solutions.
7. **Maximise factor exposure** to build multifactor credit (MFC) solutions.
8. **Match Key Rate Duration targets** for TIPS or European sovereign index-linked portfolios in Liability Driven Investment solutions.
9. **Minimise Turnover** to determine the minimum level of turnover required to fine tune an account's positioning or rebalance it within a new risk framework. This is especially useful when a mandate has been transferred from another portfolio manager or when investment guidelines have been changed significantly. We perform initial exploratory steps before generating a final investment solution using one of the other objective functions.
10. **Match ISIN and ticker weight**, to upsize or downsize a model portfolio to any target size while maintaining its positioning. This especially useful for intra-month inflows/outflows, or to deploy leader/follower model portfolios in tandem for a given strategy.

Key constraint components

1. Universe of securities held or eligible, as well as their analytics.
2. Optimisation target (maximum yield, greatest factor exposure, minimum deviation).
3. Dynamic constraints related to:
 - a. Risk budget
 - b. Client and mandate-specific requirements
 - c. Regulatory factors (including tax guidelines)
4. In-house investment indicators and proprietary research outputs.
5. Tolerance levels (the extent to which small deviations from the numerical constraints are permitted).
6. Maximum permitted portfolio turnover.
7. Estimated transaction costs. on a per-instrument basis.

Risk budget variables

The optimiser allows investment managers to define a precise risk budget across a wide array of analytics including:

- Credit risk weight.
- Average rating.
- Credit-risk units (duration multiplied by spread).
- Duration risk.
- Curve risk by key rate.
- Currency risk.
- Regulatory, book value and tax constraints, which are relevant for solvency constrained optimisations, RWA positioning and low turnover mandates such as pension plans.

Customised credit risk constraints apply to:

- Overall portfolio statistics.
- Currency diversification.
- Sector concentration.
- Regional tilts.
- Credit rating dispersion.
- ESG rating concentration and distribution.

Important Information

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