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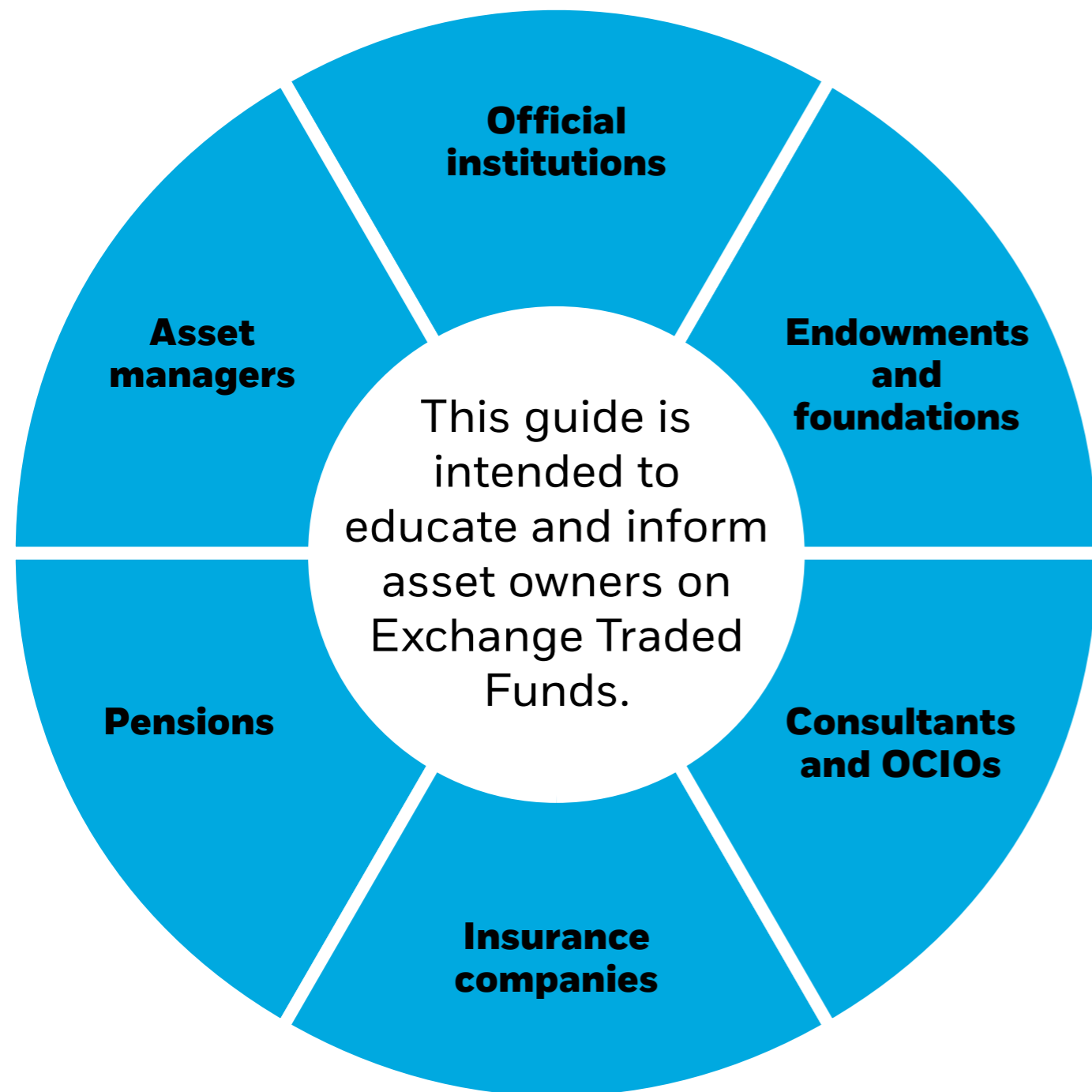
iShares[®]
by BlackRock



ETF GUIDE

FOR ASSET OWNERS, ACCREDITED, INSTITUTIONAL
AND WHOLESAL INVESTORS

ABOUT THE GUIDE



STEPHEN COHEN
Chief Product Officer for
BlackRock

FOREWORD

Exchange traded funds (ETFs) have emerged as one of the most transformative financial innovations of this generation. The advent of ETFs over 30 years ago equipped investors of all types with an efficient way to access a wide range of market exposures, with liquid, transparent execution. Ever since, institutions – including central banks, sovereign wealth funds, pension funds, and many other investor types – have found increasingly innovative ways to integrate ETFs into their investment strategies.

ETFs are revolutionising how asset managers, asset owners and wealth managers construct their portfolios.

The remarkable thing about ETFs is that they are more than an investment vehicle. Similar to other technologies, quality and choice have increased even as overall costs have come down. The continued innovation in response to evolving client needs has only accelerated in the 3 years since I led our ETF business in EMEA. ETFs are continuing to expand to a broader set of investment strategies across index and active, including outcome-oriented solutions, further enabling access to differentiated sources of return.

This ever-expanding scope of ETFs and potential use cases are well suited for customisation in support of diverse investment strategies. Whether used for risk management, strategic allocations, or as tools for expressing active views, ETF adoption is still accelerating, particularly among many of the world's largest and most reputable institutions.

Institutions use ETFs to allocate capital, adjust positions, and manage risk in ever-changing market conditions. Asset owners in particular have discovered that ETFs can help satisfy a wide range of investment objectives by offering diversification, ease of execution, product depth, and liquidity - especially in bond markets. For example, 2023 saw the introduction of fixed maturity bond ETFs in Europe, Asia and Latin America, an outcome-oriented solution particularly well-suited to certain asset owner investment challenges.

In this guide, BlackRock experts discuss common uses of ETFs and examine the ETF market from the perspective of asset owners.

Whatever your investment strategy, and whatever your level of ETF usage, this guide will help you better understand how these readily available instruments can be used to achieve your financial objectives.

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References to specific ETFs are for illustrative purposes only and included as examples to show how ETFs work. ETFs mentioned may not be registered and therefore not available in your country and/or jurisdiction.

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1.1 THE BIG SHIFT

With over 30 years of history now in the rearview, ETFs have emerged as one of the most transformative financial innovations of this generation. ETFs offer a wide range of highly precise, transparent exposures with low cost and intraday liquidity—features that have driven widespread global adoption.

ETFs have also become the go-to vehicle for transferring risk, particularly in times of extreme market volatility. This was evidenced by surges in ETF trading volumes during both the global financial crisis and, more recently, the coronavirus pandemic.

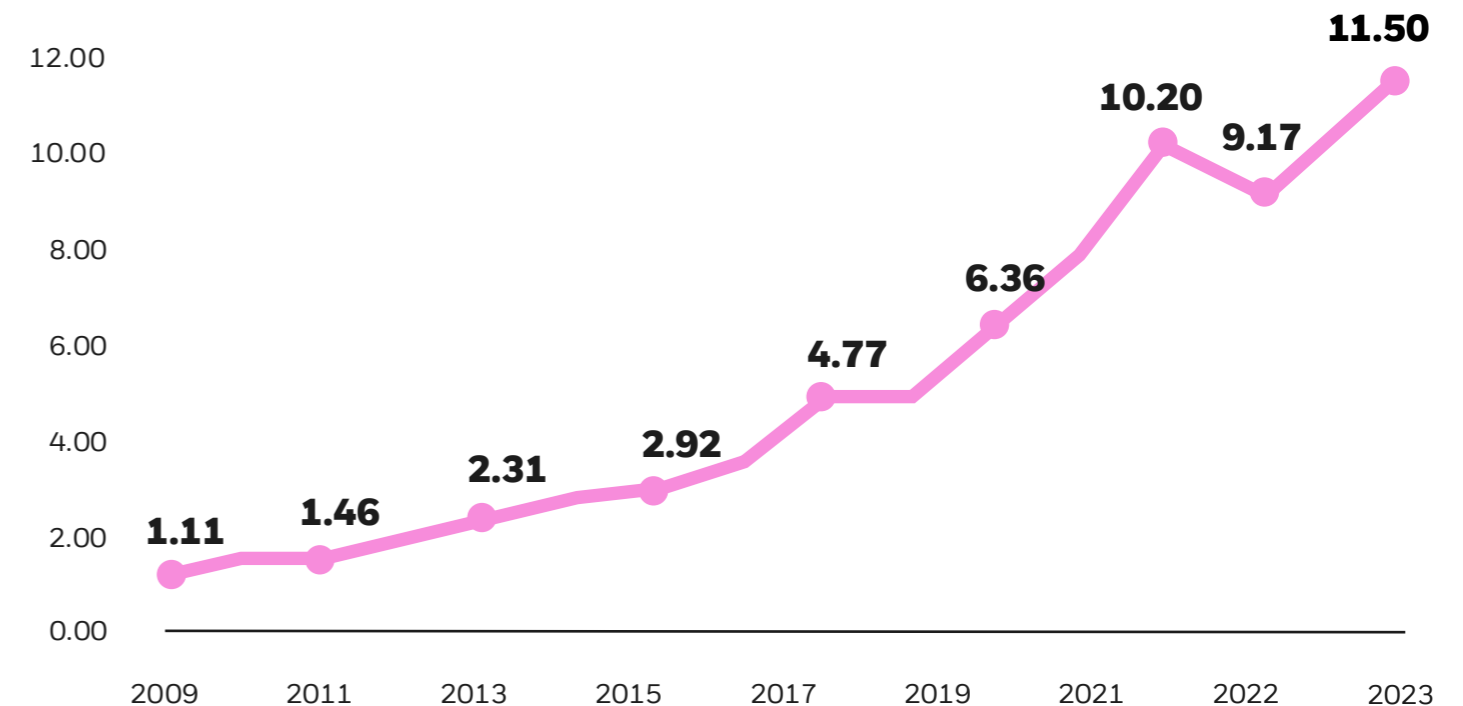
What is an ETF?

ETFs are pooled funds that trade like a stock on a regulated stock exchange. They can provide access to a broad range of investment strategies across index and active, in a convenient wrapper.

ETFs take the simplicity and benefits of a listed single stock – such as liquidity, on-exchange trading, and transparency of holdings – and (typically) combines this with the benefits of an open-ended mutual fund –such as instant diversification, cost-efficiency, and the ability to create and redeem fund units.

The ETF industry has increased significantly in size over the last decade, growing from \$1.1 trillion in 2009 to more than \$11.5 trillion today.⁴

Global ETF assets under management (2009–2023)⁴



⁴ Source: BlackRock Global Business Intelligence, 31 December 2023. All \$ values are in USD.

INTRODUCTION TO ETFs

1

1.2 THE BENEFITS OF ETFs

All institutions—including sovereign wealth funds, pension funds, and a broad range of other investor types—share in the benefits of ETFs.

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Liquidity

ETFs trade on-exchange and investors can buy or sell in real time, just like stocks.

Diversification

Many ETFs provide exposure to a variety of underlying individual securities, providing diversification and insulating investors from single security price swings.

Accessibility

ETFs are like passports to numerous asset classes and market exposures (some broad, some specific).

Tax-efficiency

Investors can be insulated from the tax consequences of their fellow shareholders,⁷ particularly when it comes to exploring European UCITS vehicles.

*Tax efficiency may not be available in all jurisdictions.

Transparency

ETFs are straightforward about their investment objectives. They generally disclose holdings daily.

Flexibility

Investors use ETFs for a variety of applications, including long-term core allocations, short-term tactical adjustments, and risk management.

Low cost

The average ETF management fee is generally lower than an active mutual fund invested in the same asset class. Buying an ETF is often more cost effective than buying the underlying securities individually.

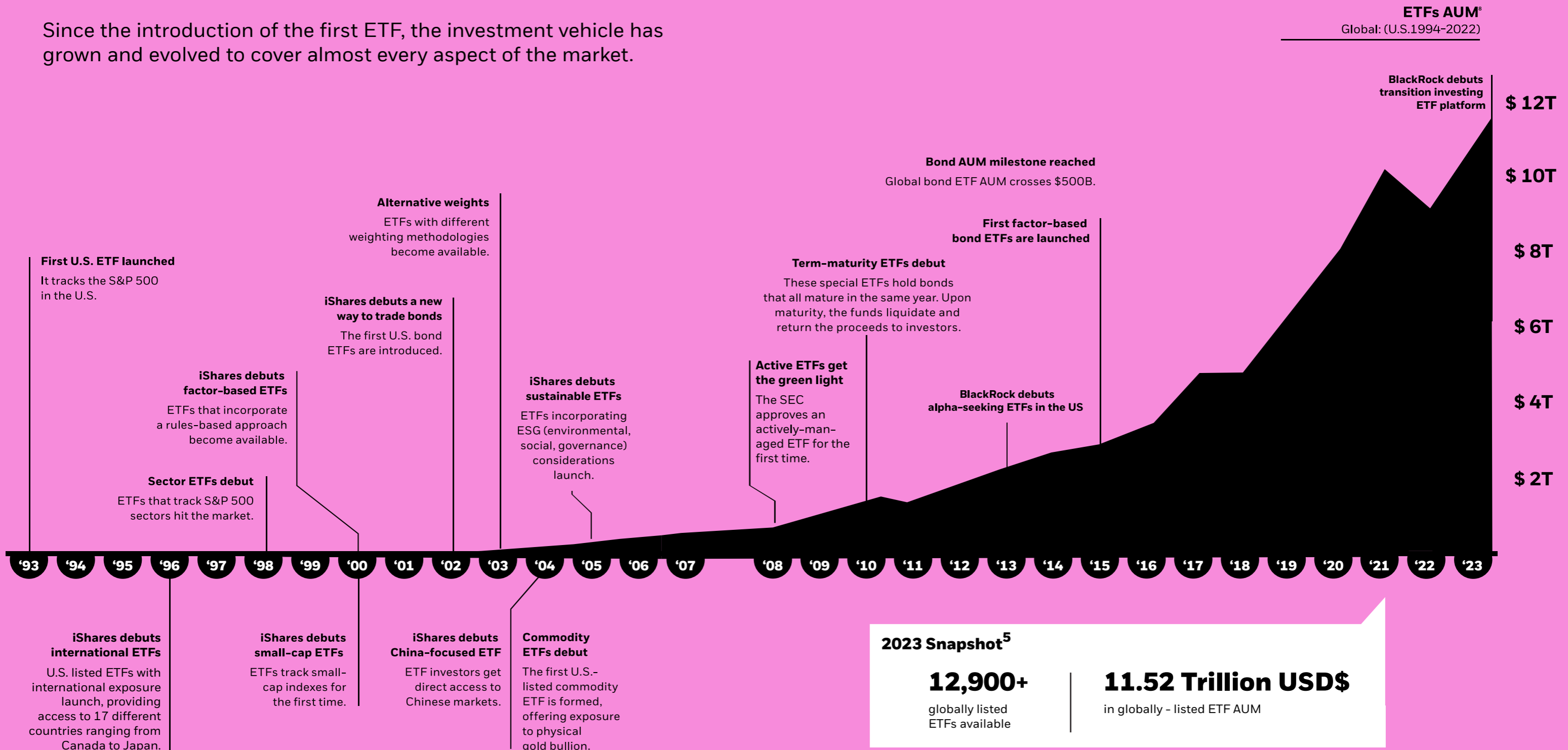
Operational efficiency

ETFs provide immediate exposure to a portfolio of securities in a single line item without the high operational costs and complexities of managing numerous individual securities and derivatives.



1.3 A SHORT HISTORY OF ETFs

Since the introduction of the first ETF, the investment vehicle has grown and evolved to cover almost every aspect of the market.



5 Source: Pre-2009 data from BlackRock and Reserve Bank of Australia, as at March 2011. Post-2009 data from BlackRock Global Business Intelligence, 31st December 2023. All amounts in USD \$ trillions.

1.4 HOW INSTITUTIONAL INVESTORS USE ETFs

Investment managers are using ETFs for a number of reasons, including diversification, ease of execution, product depth, and liquidity.

Tactical adjustments

Over- or underweight certain styles, regions, or countries on the basis of short-term views.

Core allocation

Build a long-term strategic holding in a portfolio.

Rebalancing

Manage portfolio risk in between rebalancing cycles.

Portfolio completion

Fill in gaps in a strategic asset allocation.

International diversification

Gain efficient access to foreign markets.

Liquidity management

Maintain exposure in a liquid investment vehicle to meet cash flow needs.

Management transition

Facilitate manager transitions with ETFs.

Risk management/overlay management

Mitigate undesired portfolio risk and hedge asset allocation decisions.

Interim beta

Maintain market exposure while refining a long-term view.

Cash equitization

Put long-term cash positions to work with ETFs to minimize cash drag.

Strategic (SAA) vs Tactical Asset Allocation (TAA)

The vast majority of institutional investors buy and hold broad market exposures (SAA) however we have seen an increasing number of clients that started using ETFs for Tactical Asset Allocations

especially for more niche exposures like EM Single Countries where ETFs can provide additional liquidity and market access benefits.



Key client engagement topics

1.

Transition & Sustainability

Institutional investors requiring solutions to address specific sustainability objectives including decarbonization plans under the Net Zero Asset Owner Alliance (NZAO).

2.

Building Blocks and Liquidity

Clients looking to use ETFs for liquidity purposes such as replicating a broad index or an specific exposures. including IAlts. Critical in the context of recent market volatility.

3.

Asset Allocation Evolution

Clients looking to reassess their SAAs in the context of the new market environment. Predominant focus on reallocating to Fixed Income and Alternative assets.

The three big drivers of Asset Owner specific conversations were: (1) Transition & Sustainability: we've seen a 30% increase in transition related engagements, (2) Liquidity-related topics: clients looking to replicate a broad index or build a liquidity sleeve for their SAA using ETF and (3) Asset Allocation: driven by clients expressing a change in asset allocation such as high allocation to linkers through ETFs.

Asset Allocation Evolution – using ETFs to implement asset allocation changes

Investor challenge

A UK pension scheme wanted to de-risk their pension fund given improvements to their funding ratios following the new interest rate regime experienced through 2022 and 2023.

The portfolio had high allocations to equities in an effort to achieve long term growth, given the defined benefit scheme was still open to new members.

With the attractive yields presented by fixed income, the CIO and investment team reviewed their strategic asset allocation, determining that on a risk adjust basis a 5% increase to investment grade credit, out of equities provided a similar level of returns for a lower level of risk.

How ETFs have helped

The scheme had a very granular asset allocation and wanted to implement this revised allocation via an index strategy, mitigating the due diligence requirement for an active manager.

Following deep analysis on various index options, particularly understanding the total cost of both trading and holding the wrappers, the scheme decided to leverage ETFs.

The robust liquidity and low trading costs, alongside the transparent pricing and exposure meant the scheme was able to efficiently implement this new re-risking strategy, and also had a clear understanding of the new risk profile of the portfolio.

Case studies are for illustrative purposes only; they are not meant as a guarantee of any future results or experience, and should not be interpreted as advice or a recommendation.

Sustainable & Transition Investing

Investor challenge

BlackRock Portfolio Analysis and Solutions (BPAS) recently worked with a pension fund in Continental Europe to understand how to best execute their decarbonisation targets.

The pension had a 25% emissions target reduction by 2025.

How ETFs have helped

We provided 4 illustrative options built with iShares Transition ETFs tracking Climate Transition Benchmark (CTB) and Paris Aligned Benchmark (PAB) indices to showcase the benefits of using year on year decarbonisation to accelerate their decarbonisation journey.

We demonstrated how the total portfolio carbon intensity could be reduced from 122 tonnes / \$million (sales) to 54 tonnes / \$million (sales) using iShares enhanced CTB & PAB.

The 4 options provided also exhibit a similar risk return profile to the actual portfolio as a result of the optimised approach of these ETFs which minimises tracking error.

Building Blocks and Liquidity

Investor challenge

UK Asset Owner looking to simplify and rationalise their core fixed income portfolio (£40M + 5% of their equity to be shifted per year).

Currently invested with different providers across different active/passive strategies.

They wanted to track Bloomberg Barclays Global Aggregate Index Global Agg ex-Securitized (the securitised part to be considered for a second stage) through index funds or ETFs

How ETFs have helped

BlackRock Portfolio Analysis and Solutions (BPAS) worked to optimise the most appropriate portfolio allocation in terms of share classes, hedging to GBP, and allocation weight. A minimal tracking-error approach was adopted.

The solution proposed utilises only 3 building blocks, achieving very limited tracking error vs the target exposure, A fee reduction of more than 70% vs current allocation, and an improvement in the sustainability profile.

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LOOKING UNDER THE ETF HOOD 2

2.1 ETFs: A COMPARISON WITH INDEX MUTUAL FUNDS

Both ETFs and index mutual funds are a collection of securities packaged into a fund, with most ETFs designed to track an index. Exposures for both types of funds can range across fixed income, equity, and commodities. However, there are some differences between ETFs and mutual funds - primarily in how they trade.

Index mutual fund

Index mutual fund investors can trade directly with the fund once a day.

ETFs

ETFs are traded on stock exchanges throughout the day.

ETFs vs. index mutual funds

Similarities

- Diversification
- Management fees
- Valuation frequency
- Portfolio management

Differences

- Tax-efficiency (may vary across regions)
- Fee structure(s)
- Transaction costs
- Transparency

Looking under an ETF's hood on Bloomberg

See our Bloomberg analytics section to explore the <DES> function, where investors can view an ETF's composition and key metrics.



Learn more in Chapter 5

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Index ETFs vs. index mutual funds

	Index exchange traded funds (ETF)	Index mutual funds (IMFs)
Registration	Typically Investment Company Act of 1940	Investment Company Act of 1940
Pricing/ Net Asset Value (NAV) valuation	Intraday and NAV valuations	Daily and solely at Net Asset Value (NAV)
Minimum investment	None	Minimum investment sizes may apply depending on share class
Liquidity	ETF secondary volume and underlying portfolio (basket) holdings	Underlying portfolio holdings

The above table is for illustrative purposes only. It serves as a general summary and is not exhaustive. It does not apply to every single product. Please refer to the relevant prospectus for further details.

	Index exchange traded funds (ETF)	Index mutual funds (IMFs)
Objective	Match the performance of the index	Match the performance of the index
Structure of the wrapper	Similar to listed equities	Similar to traditional collective investment schemes
Exposure	Generally offers a wide range of broad and precision exposures	Generally offers broad building blocks
Purchase and sell	On exchange throughout the day	Through transfer agent
Subscription and redemption	Primary market (subscription/redemption) Secondary market	Only primary market (subscription/redemption)
Price valuation	Throughout the entire trading day through ETF price	Once a day at valuation point (NAV)
Trading	Throughout the day Trading orders are possible	Daily liquidity (NAV)
Minimum investment	Typically one share	Minimum investment depends on the share class
Transparency	Fund holdings published daily	Fund holdings typically published monthly/quarterly
Option markets	Options available	N/A

Source: BlackRock, as of 31/12/2023. For illustrative purposes only. Shares of ETFs can only be created and redeemed by Authorized Participants, in very large creation/redemption units.

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2.2 THE MULTIPLE LAYERS OF LIQUIDITY

ETFs trade on open exchanges

ETF investors do not interact directly with fund providers when buying or selling fund shares, like mutual fund investors do. Instead, ETF investors buy and sell shares on-exchange like they would with individual stocks.

A separate 'primary' market involves large institutions transacting with ETF issuers to create or redeem ETF shares based on market demand. For investors, this entire process is managed behind the scenes by a highly regulated network of financial institutions (often banks) called authorized participants.

Authorized participants dynamically manage the creation and redemption of ETF shares in the primary market. This process adjusts the number of ETF shares outstanding and helps keep an ETF's price aligned with the value of its underlying securities.

Each share of an ETF represents partial ownership in an underlying portfolio of securities, such as stocks and bonds.



While technically funds, ETFs are typically categorized as securities rather than investment funds. As such, all bond, equity, and commodity ETFs are given an equity ticker on Bloomberg - indicating they trade on-exchange.

Learn more in Chapter 5

ETF FAQs

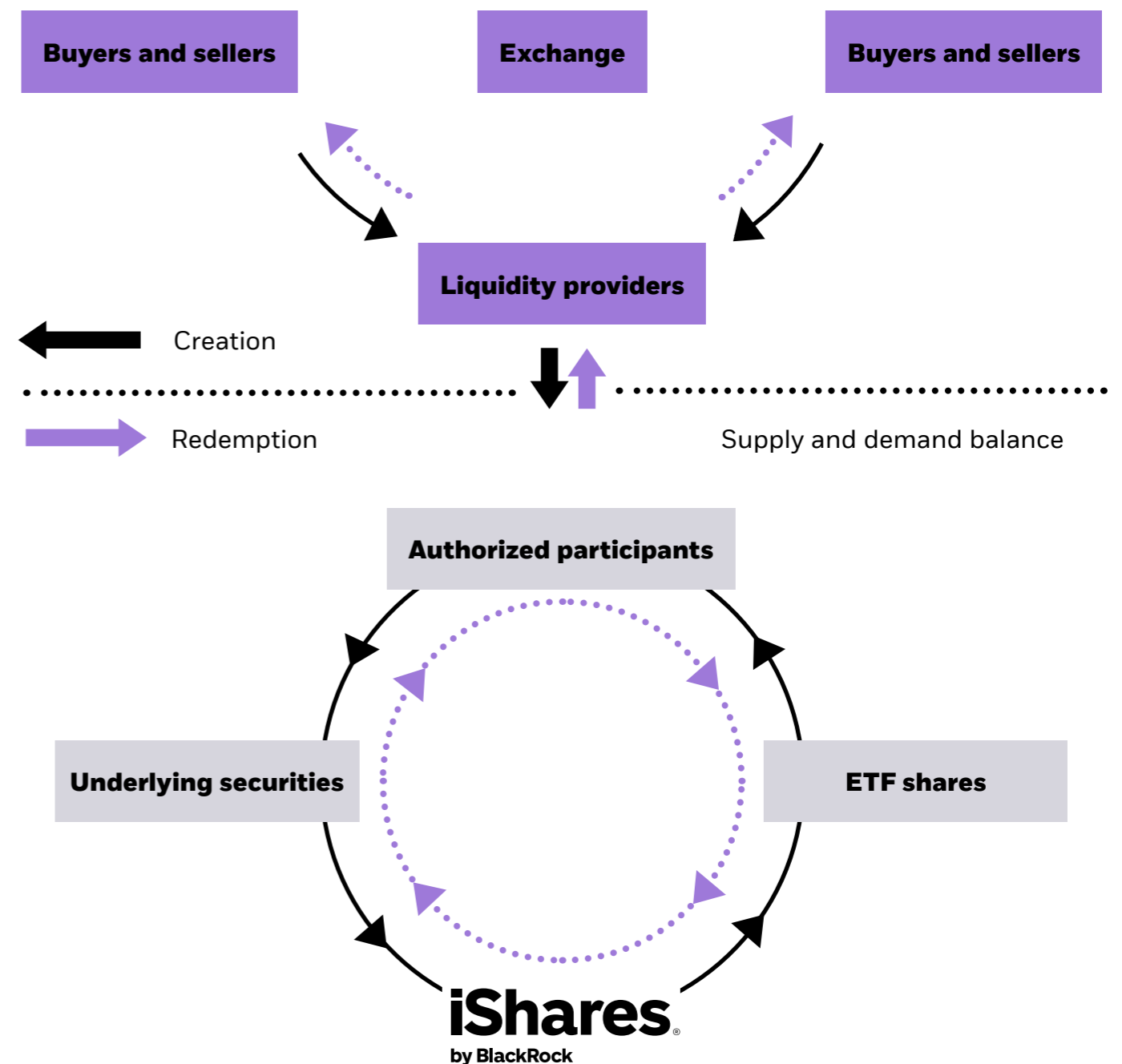
Do ETF investors have credit exposure to the ETF provider?

Most investors are careful when choosing investment vehicles, as they know they can have different ownership implications and levels of investor protection. For example, iShares ETFs are open-ended umbrella investment companies. Legally, they are distinct and separate from BlackRock, which serves as an appointed manager for the funds. The assets of securities held within the iShares funds belong exclusively to the respective funds themselves, and are ring fenced and entrusted to a third party custodian for safe keeping. In the unlikely event BlackRock should cease to exist, iShares funds could continue to operate with another investment manager.

Do ETFs have a credit rating?

The vast majority of ETFs do not have a credit rating at the fund level, but the credit ratings of the ETF's underlying assets should be readily observable. iShares ETFs allow for daily look through, however, not all ETF providers offer this feature.

The ETF creation/redemption process



For illustrative purposes only.

Creation

The authorized participant buys the securities that make up the ETF's underlying basket and transfers them in-kind to the ETF provider, who creates new ETF shares. **The authorized participant then sells those new ETF shares on exchange.**

Redemption

The authorized participant transfers shares of the ETF to the ETF provider, who then exchanges the ETF shares for the underlying securities. **The authorized participant then sells those securities on exchange.**

Learn how creations and redemptions are used to anchor an ETF's price to its net asset value in the appendix.

Layers of liquidity

What makes ETFs easily tradable, even in times of market stress? The simple answer is liquidity, or the ability to buy or sell a security without causing a material change in its price. In fact, ETFs have characteristics that can give them multiple layers of liquidity.

ETF trading between buyers and sellers occurs in the secondary market

ETF trading occurs in the secondary market in much the same way as a normal stock. Investors buy and sell ETFs using common order types, such as market and limit orders and ETFs are quoted with bids and offers.

Only a small portion of ETF trading requires the primary market

The majority of ETF trading occurs without triggering trading activity in the underlying securities. Primary market liquidity refers to the trading volume of a funds underlying securities. In aggregate, primary market liquidity is often much greater than an ETFs secondary market liquidity and it serves as an additional liquidity source should the secondary market be exhausted. This essentially makes an ETF at least as liquid as its underlying holdings.

Looking under an ETF's hood on Bloomberg

See our Bloomberg analytics section to explore the <BBO> function, where investors can view a bond ETF's orderbook.

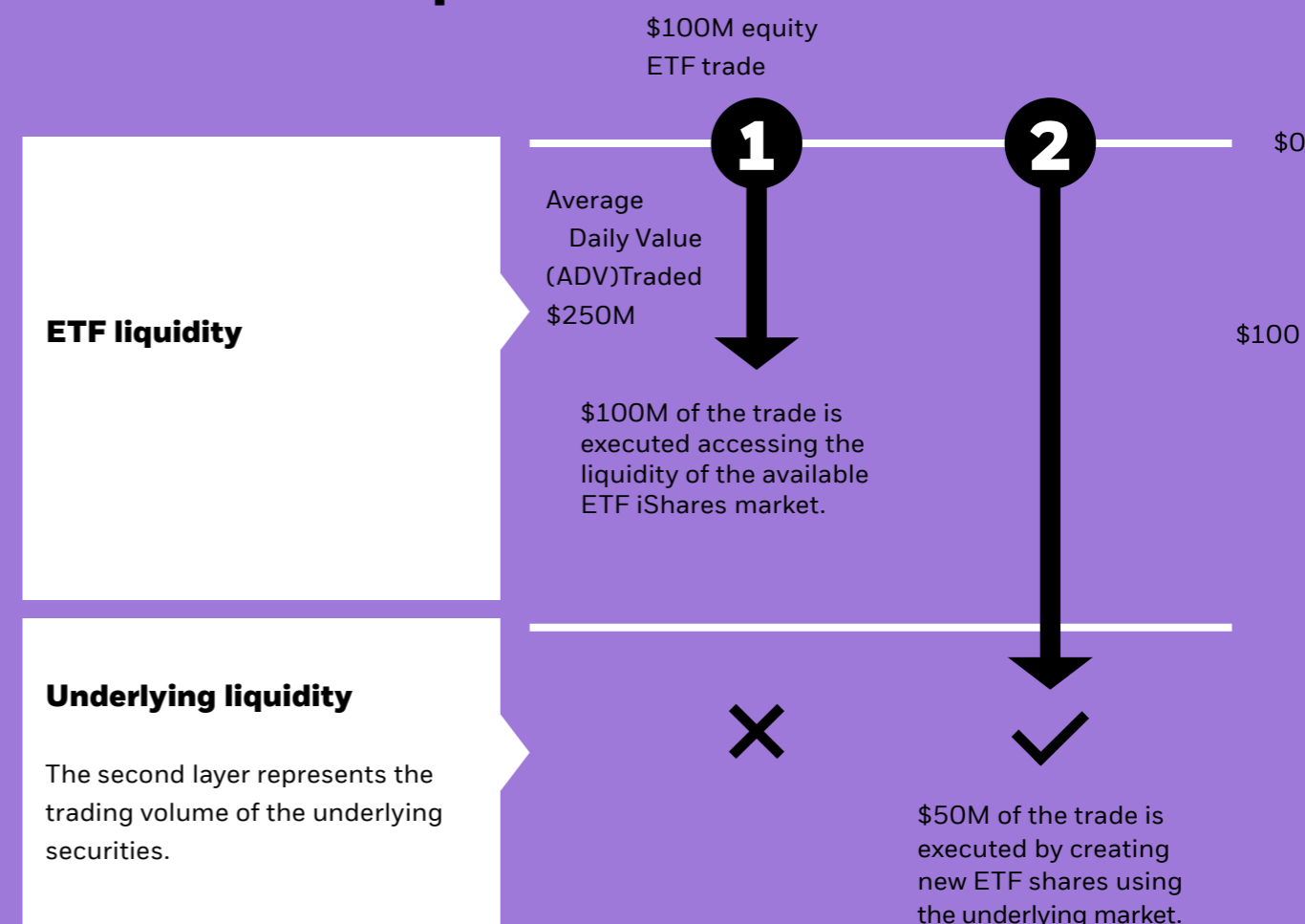
Learn more
in Chapter 5

For illustrative purposes only. There can be no assurance that an active trading market for shares of an ETF will develop or be maintained. Shares of iShares ETFs may be bought and sold throughout the day on the exchange through any brokerage account. Shares are not individually redeemable from ETFs; however, shares may be redeemed directly from an ETF by Authorized Participants, in very large creation/redemption units.

Trades of all sizes can benefit from ETF liquidity

The multiple layers of liquidity are apparent when trading an ETF with relatively low average daily volume (ADV).

Illustrative example



For illustrative purposes only. In many cases, investors can fulfill ETF purchases through existing market liquidity on the exchange. Large trades exceeding the exchange liquidity result in the creation of new ETF shares to complete the remainder of the order.

Settlement

ETF trades can be settled through traditional security channels, such as Euroclear and Depository Trust Company (DTC). As ETFs are traded on private exchanges, it is important to note that they cannot be settled on Fed Wire like US Treasuries.



ETF SELECTION 3

3.1 THE FIDUCIARY'S CHECKLIST FOR SELECTING AN ETF

There are several factors to consider when choosing from the increasingly large ETF marketplace. iShares institutional clients frequently ask the following questions as they conduct due diligence:

Exposure

Does the ETF offer the right exposure?

Key considerations

Benchmark quality

High-quality benchmarks are backed by index providers that ensure they are trackable, complete, and accurately represent the investment opportunity.

Targeted exposure

ETFs may target specific countries, sectors, or investment themes, or they may offer broader market exposures.

Investment outcome

ETFs may provide access to market exposures, be designed to deliver a specific investment outcome or have a goal to outperform.

Questions to ask

- What is the ETF's investment objective?
- What is the underlying index methodology?
- How widely followed is the index and how long has it existed?
- How often are holdings published?
- How does the ETF track its benchmark?
- How closely has the ETF tracked its benchmark in the past?
- Does the ETF use leverage or inverse strategies?
- What is the underlying investment strategy?
- Is this ETF designed to deliver a specific outcome or generate alpha?

Provider

Know your provider.

Key considerations

Experience

Work with providers who manage and develop ETFs that have track records of delivering intended outcomes.

Analytics

The provider should regularly use analytics to evaluate the product's exposures.

Transparency

The provider should offer risk, performance, and factor evaluations on a regular basis to ensure the product is delivering the intended outcomes.

Product breadth

A diverse menu of options allows solutions for a wide variety of intended investment outcomes.

Size

Large ETF providers can create efficiencies of scale that may reduce the costs of their ETFs.

Questions to ask

- What experience and expertise does the provider have in managing ETFs?
- What risk management and performance analytics does the provider use to monitor the product's performance and intended exposure?
- What is the provider's total assets under management (AUM) and ETF product breadth?
- What are the provider's risk management processes?
- What other services does the provider offer (e.g. Portfolio Analysis, Model Portfolios, etc.)?

3.2 ETF TRADING BEST PRACTICES

Trade execution

Getting the most out of ETF trade execution

Securing quality trade execution is important to long-term returns. In fact, a systematic process for trade execution is as important as investment vehicle selection.

Identifying the most appropriate trading strategy for ETFs requires an understanding of the multiple sources of ETF liquidity and ETF pricing mechanics.

How ETF pricing works

An ETF has a market price and a net asset value (NAV).

- The market price is the price at which investors transact in the secondary market on-exchange throughout the trading day.
- NAV is the stated value of the fund's underlying holdings from the close of business on the previous trading day.

When an ETF's price is above or below the fund's NAV, it is said to be trading at a premium or discount, respectively.

The premium or discount may be the result of timing differences and transaction costs not reflected in NAV or short-term supply and demand imbalances for shares of the ETF on-exchange.

Over the long-term, an ETF's price is generally anchored to its NAV due to market makers and authorized participants who act on small arbitrage opportunities between the ETF market price and NAV.

For illustrative purposes only.

Illustrative example

Market Price

\$10.10

(1% premium)

If an ETF is trading above its intraday NAV, it is trading at a premium.

ETF net asset value (NAV)

\$10.00

Market Price

\$9.90

(1% discount)

If an ETF is trading below its intraday NAV, it is trading at a discount.

Three ways to trade ETFs

Given an ETF's multiple layers of liquidity, investors can choose either risk, agency, or NAV trades to meet their specific execution goals.

1 Risk trade

WHAT	Engage a broker-dealer to execute a block trade. The broker - dealer carries the risk by having the trade on their books and prices the risk into their quote.
WHEN	Best suited for large orders with urgency, where immediate execution is the priority. Results in a firm price and eliminates execution risk.
WHY	This strategy is typically deployed when the risks of delayed implementation outweigh the benefits of working an order.



iShares tip: Ask for two-sided markets and selectively put brokers in competition to find the best price.

2 Agency trade

WHAT	Brokers execute on behalf of the client with a strategy such as volume-weighted average price (VWAP) or time-weighted average price (TWAP) and pass on the prices they receive for an agreed mark - up or commission.
WHEN	Best suited for trades in ETFs with robust exchange volume, tight bid/ask spreads or where transparency exists on both costs and the underlying basket.
WHY	Prioritizes minimizing market impact over immediate execution by accessing multiple layers of liquidity, participants, and venues.

iShares tip: Be mindful of the premium or discount throughout the trade execution window and adapt as necessary.



3 NAV trade

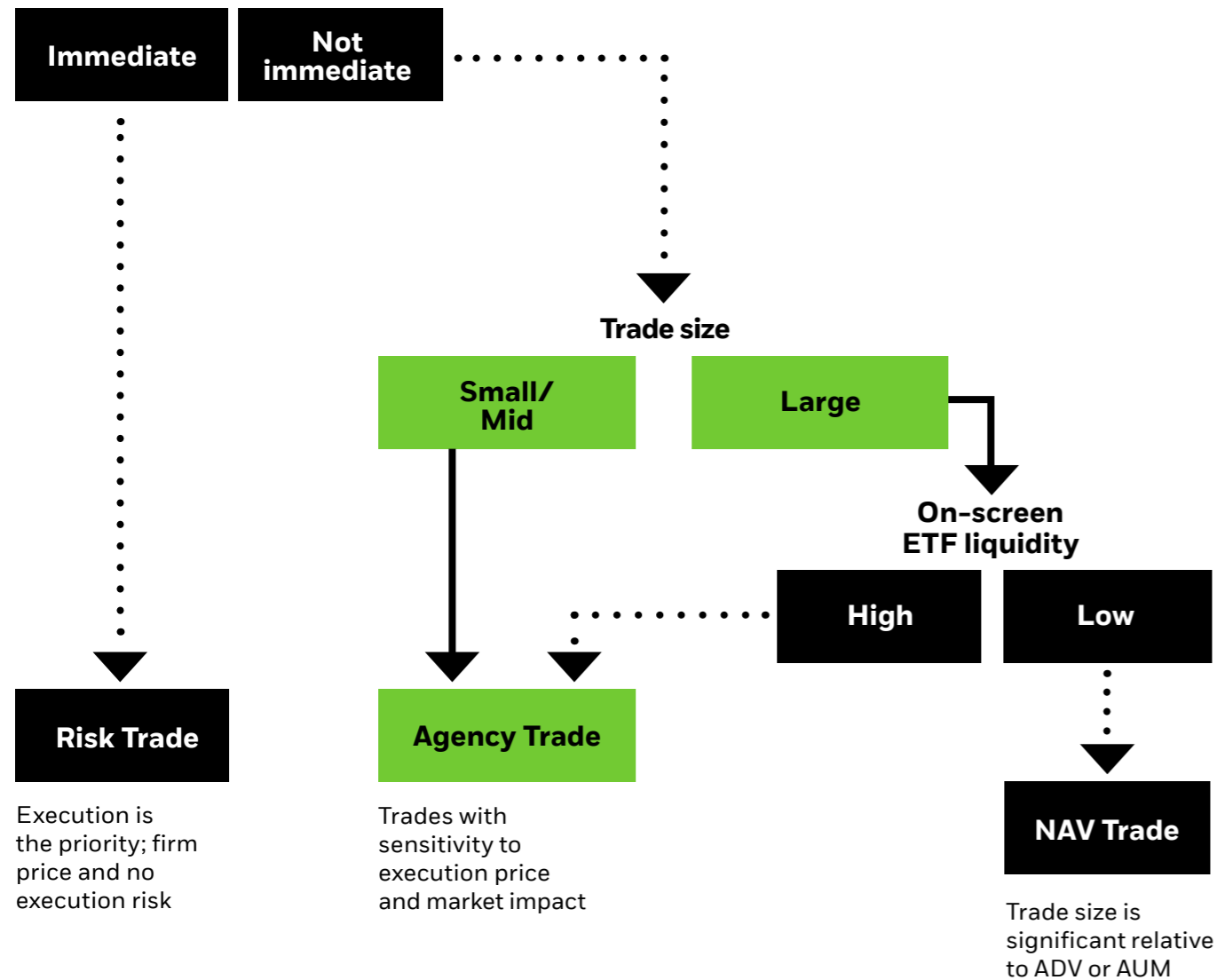
WHAT	Engage an authorized participant to explicitly create or redeem shares with an execution price targeting the ETF's NAV.
WHEN	Best suited for trades where having a certain daily valuation point is more important than market timing.
WHY	Useful when switching out of a mutual fund into an ETF or between similar ETFs. Also provides the potential ability to move securities from an existing manager to a passive strategy while maintaining market exposures.

iShares tip: Be cognizant of the capabilities of the liquidity provider – some may have competitive advantages depending on the asset class.



THE MOST APPROPRIATE STRATEGY

Execution urgency



For illustrative purposes only. This is general guidance only and does not take specific investor needs into account. You will need to consider your circumstances when deciding on the most appropriate trading strategy.

3.3 ETFS AS FINANCIAL INSTRUMENTS

A subset of ETFs has evolved to serve many functions for institutional investors. These utility players—known as financial instruments—are typically large and liquid and are often used interchangeably with derivatives in professional portfolio management.

ETFs may be used by large investors as financial instruments, typically in three main ways:

1

Risk transfer

As volatility rises, ETFs typically account for a higher percentage of total trading, underscoring their utility as risk-transfer tools.

2

Market access

Restricted currency markets, high yield bonds, and physical commodities are just a few examples of markets where ETFs frequently serve as proxies for the underlying market.

3

Multi-directional exposure

ETFs with deep options and securities lending markets can help all types of investors implement many different investment views and generally deepen on-exchange liquidity.



ETFs AND THEIR APPLICATIONS

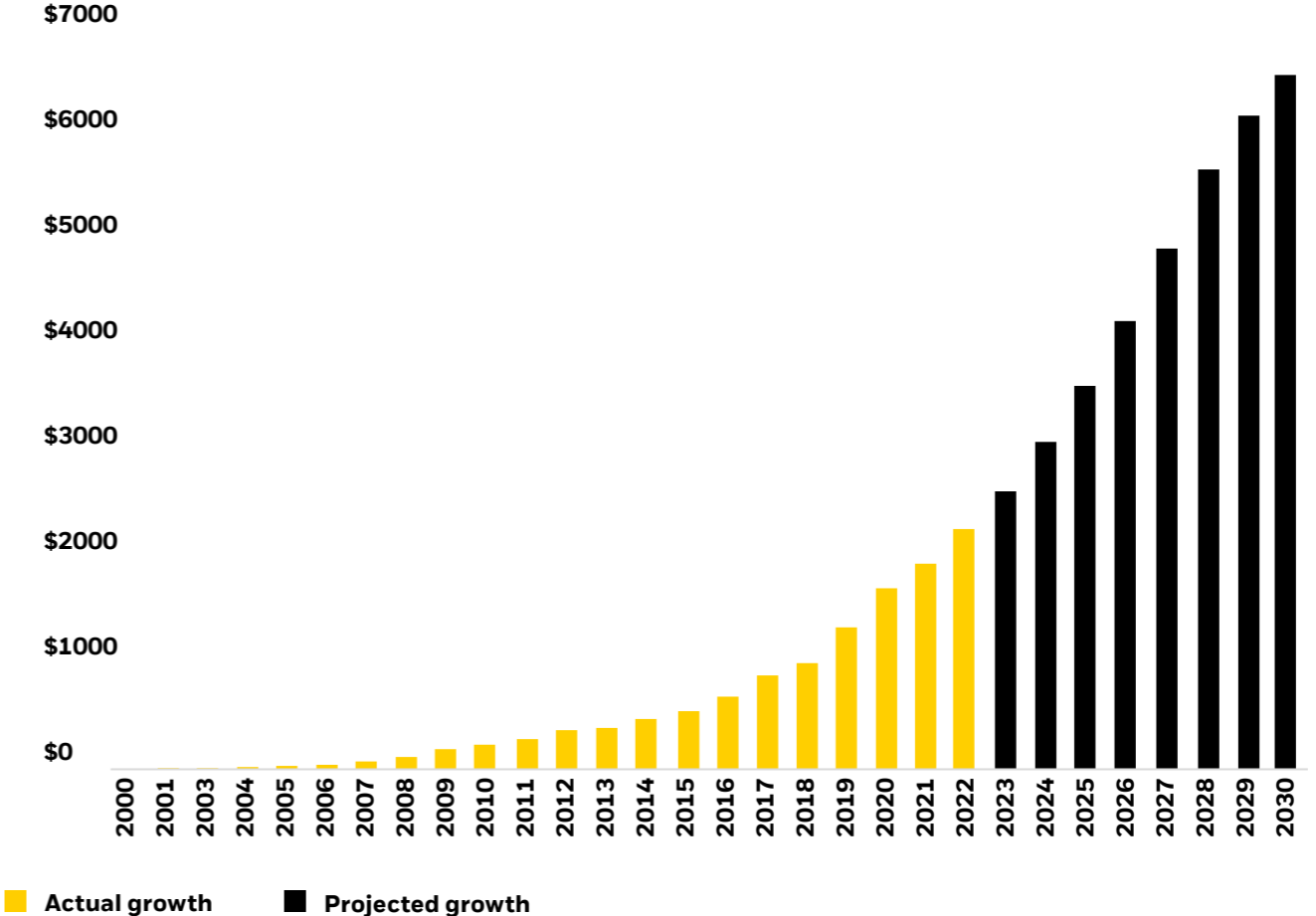
The Global Positioning System (GPS) revolutionized nearly every industry in the world. Originally conceived as a military navigation system, GPS now helps farmers deliver better crops, allows first responders to more accurately deploy rescue efforts, serves as the backbone for the ridesharing industry, and much more. GPS features hundreds of applications while solving for both simple and complex problems. In the same way, investors use ETFs for dozens of unique applications. Pliable and multifaceted, ETFs solve for everything from portfolio gaps to complex risk management and alpha-generation.

4.1 BOND ETFs

A bond ETF is a portfolio of individual bonds that trades on an exchange, making bond investing simple and transparent. Bond ETFs offer markets on-demand and provide diversified access to both broad and more precise exposures in a single trade. Simple, fast, and efficient, bond ETFs can act as investment building blocks or be part of highly customized strategies. BlackRock projects that global bond ETF AUM will reach USD 6 trillion by the end of 2030.

Investors are rapidly adopting bond ETFs³

Actual and projected growth of global bond ETF AUM (USD B)



³ Source: BlackRock projection, 31st December 2023. Subject to change. The figures are for illustrative purposes only and there is no guarantee the projections will come to pass.

ETFs IN ACTION 4

FOUR POWERFUL BOND ETF GROWTH TRENDS



Building blocks in evolved 60/40 portfolios

1



Tools for seeking active returns

2



Catalysts for modernizing bond markets

3



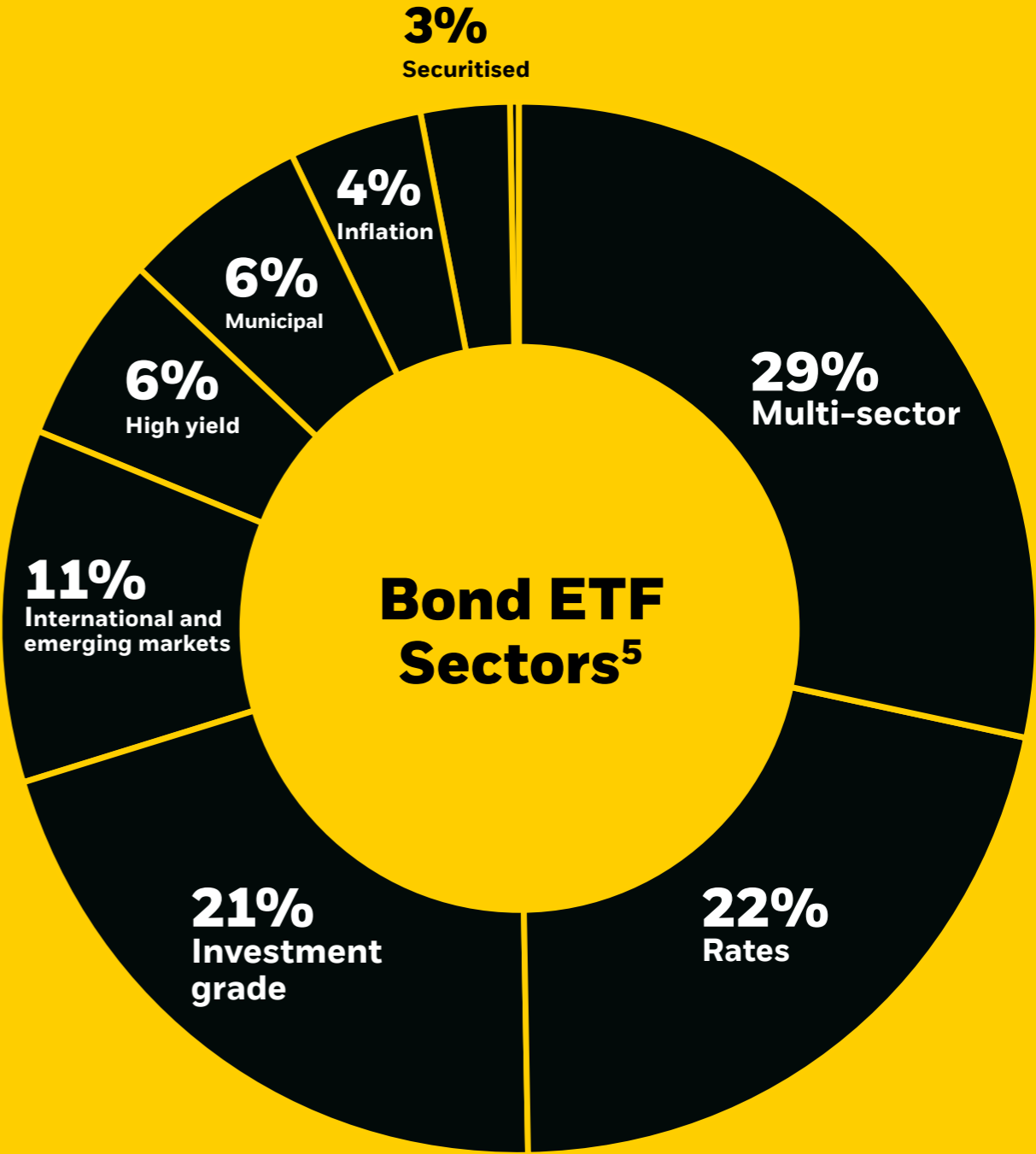
Increasingly precise sources of potential returns

4

54%

institutional investors increased use of bond ETFs as a means to source, price, and transact in cash bonds during the recent market volatility.⁴

4 Source: Institutional Investor, Rising to the challenge of a dynamic market: Institutional investors respond to uncertainty in 2022, June 2022. Based on 758 respondents. Usage figures come from a global survey of institutional investment decision makers at asset management firms surveyed in Q1, 2022. This study was sponsored by BlackRock. BlackRock is not affiliated with Institutional Investor or any of their affiliates.



5 Source: BlackRock, Global Business Intelligence, 31st December 2023. The chart represents the % AUM weight of each bond ETF sector.

Bond ETF applications

How ETFs can address investor challenges

Investor challenge

Potentially enhance yield without excess credit risk

An institutional Investor with a USD-denominated portfolio sought to enhance yield, while only modestly increasing credit risk. The portfolio manager was willing to consider expanding the credit universe to achieve their goal.

How ETFs could help

Seeking yield potential with a modest increase in risk

The portfolio manager purchased a dollar-dominated investment grade corporate bond ETF, which included several benefits:

- Higher yield relative to base government market
- Diversified investment of more than 2500 securities
- Ease of execution
- On-exchange liquidity

Upon review of this investment, the Investment Committee recognized that gaining exposure to the asset class did not expose the portfolio to individual security risk. It also allowed a lower minimum credit rating tolerance for an index exposure. While a security default would still affect the value of the index, it would be partially mitigated by name diversification in the index.

Capital at risk. You may get back less than you invested. Case study shown for illustrative purposes only. This is not meant as a guarantee of any future result or experience. This information should not be relied upon as research, investment advice, or a recommendation regarding the iShares Funds or any security in particular. Source: BlackRock, 31 December 2023.

Investor challenge

Balancing investment performance with liquidity management

A portfolio manager must balance cash flow needs, while simultaneously maintaining exposure and limiting the effects of cash drag.



With rising interest rates and wider credit spreads increasing the cost of funding, a reduction in new bond issuance volumes can challenge liquidity for investors.⁷ Therefore, the portfolio manager prefers to use a cash sleeve for liquidity management instead of frequently buying and selling individual bonds. However, employing such a strategy can lead to performance drag.

How ETFs could help



Competitive performance and sufficient liquidity

Investors can use bond ETFs, in both stressed and less volatile market environments to replicate a liquid version of the broader portfolio to achieve low-cost exposure without incurring the cash drag of uninvested assets.

Cash liquidity sleeve

-  Cash allocation results in performance drag
-  Vehicle liquidity allows for rapid execution

Dollar-denominated high yield corporate bond ETF as a liquidity sleeve

-  Partial allocation to a high yield ETF reduces performance drag
-  Vehicle liquidity allows for rapid execution

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7 Source: Federal Reserve Bank of New York. Data as of 31/08/2022. Calculation based on primary dealer inventory for USD IG and USD HY bonds issued in the US

Investor challenge

Potentially enhancing yield while maintaining credit rating guidelines

An institutional investor with a USD-denominated portfolio sought to enhance yield, and the portfolio manager was willing to consider expanding the credit universe to achieve this goal. However, the portfolio manager's investment committee would not permit securities with credit ratings below AA.

How ETFs could help

Additional yield potential with credit rating compliance

Given their minimum credit rating tolerance, the investor decided to explore the US agency Mortgage Backed Security Market and decided to choose a mortgage-backed ETF, which offered:

- Higher yield relative to base government market
- Ease of execution
- On-exchange liquidity

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7 Source: Federal Reserve Bank of New York. Data as of 31/08/2022. Calculation based on primary dealer inventory for USD IG and USD HY bonds issued in the US

Investor challenge

Capital call management

An institutional investor, typically managing a diversified portfolio that includes alternative investments such as private equity, hedge funds, or real estate, is actively seeking avenues to generate income.

However, the investor faces a unique challenge: they must balance the imperative to generate returns with the need to maintain sufficient liquidity at specific dates. This liquidity is essential to meet the demands of their investment strategy, particularly the regular capital calls common in alternative investment structures.

These capital calls often require quick access to funds, necessitating a careful approach to portfolio management that optimizes both income generation and liquidity preservation.

How ETFs could help

Utilise fixed maturity ETFs that mature in line with expected capital call dates

The institutional investor with alternative investments can use fixed maturity ETFs such as iShares iBonds ETFs to generate income whilst maintaining the liquidity required to meet regular capital calls.

These specialized ETFs offer a unique combination of attributes ideally suited to the investor's objectives. By investing in fixed maturity ETFs, the investor gains exposure to a diversified basket of fixed-income securities with predetermined maturity dates. This feature provides a clear investment horizon, allowing the investor to match the income generation with the timing of their capital requirements.

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Investor challenge

Reduce the total cost of ownership

An investor should consider the total cost of ownership when evaluating buying a bond ETF versus a portfolio of individual bonds (assuming the risk characteristics are similar).

The total cost of ownership (TCO) considers both the costs of holding an investment over a period and the cost associated with trading into and out of the investment.

The TCO of a portfolio of individual bonds can be expensive for the investor once entry and exit trade costs are considered alongside holding costs.

How ETFs could help

ETFs provide a diversified access at low cost

Bond ETFs may exhibit a lower cost of ownership relative to replicating a portfolio of individual bonds due to their secondary market liquidity and potential trading efficiencies (as outlined in the table below).

Further revenues can be accrued when incorporating additional operations such security lending (a transaction entails an ETF lending out securities/units held in the fund to an interested party, such as a broker/dealer or hedge fund, for a fee).

The hypothetical replicating bond portfolio results shown are hypothetical and for illustrative purposes only and do not represent any specific investment product or any client account. Past performance does not guarantee future results. Source: BlackRock, Bloomberg, as of 31/08/2023. The table shows the cost of trading a hypothetical € IG cash bond portfolio and an iShares UCITS IG € ETF. This example shows a \$50m investment for a 1-year holding period with no rebalancing during the year for the cash bond portfolio. All costs are round trip and in bps; assumes that any ETF premium or discount at trade inception remains constant over the horizon. With securities lending there is a risk of loss should the borrower default before the securities are returned, and due to market movements, the value of collateral held has fallen and/or the value of the securities loan has risen.

Table: Comparison of a hypothetical €IG portfolio trade vs. an iShares investment grade € ETF

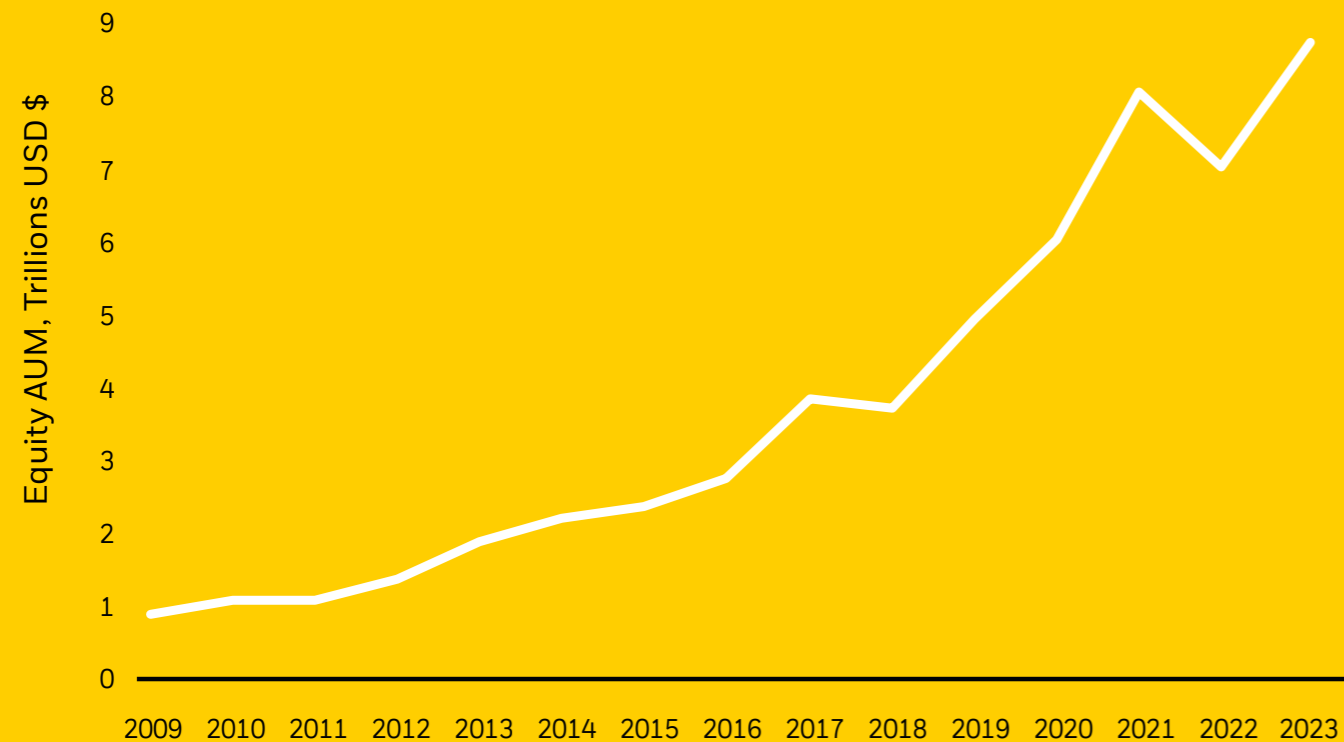
Costs (bps)	Cost/revenue Item	Hypothetical replicating €IG portfolio	An iShares UCITS IG € ETF
Entry & exit trade	Bid-ask cost, round trip	31	5
	Total round trip transaction costs	31	5
Holding cost	ETF management fee	-	20
	Securities lending (within portfolio/ETF)	-6	0
	Total	-6	14
Total cost		25	19
Securities Lending	ETF unit lending revenue	-	-10
Net cost (incl Sec Lend)		25	9

Case studies are for illustrative purposes only; they are not meant as a guarantee of any future results or experience, and should not be interpreted as advice or a recommendation.

4.2 EQUITY ETFs

Equity is the largest, most established category of ETFs, with over \$8 trillion in assets.¹⁰ The category features ETFs with targeted exposure to specific countries, regions, market capitalization levels, styles, themes, factors, and beyond.

Investors are rapidly adopting equity ETFs



10 Source: BlackRock, 31st December 2023. AUM includes the entire exchange traded product category, which encompasses any portfolio exposure that trades intraday on an exchange. AUM excludes Middle East and Africa. All \$ values are in USD.

Equity ETFs / Case study 1

Equity ETF applications

How ETFs can address investor challenges

Investor challenge

Diversifying global equity exposure

An asset owner is looking to diversify its investments with 10% being allocated to Equities. The portfolio manager is wary of incurring high trading costs.

How ETFs could help

A diversified investment in one cost-effective trade

The institution allocates 10% of its investments to an MSCI World ETF. This ETF provides access to the returns of a diversified basket of approximately 1,500 global stocks in one simple, cost-effective trade.

Equity ETFs / Case study 2

Investor challenge

Get more granular

An investment manager had a top-down country views on emerging markets. They were looking to express their convictions in a nimble and cost efficient way.

How ETFs could help

Express tactical views within your portfolio

The investment manager decided to use ETFs to express their single country emerging market tactical views. They made an overweight allocation to MSCI India UCITs ETF versus the MSCI EM index universe. This allowed for exposure to the equity market in India and an opportunity to quickly increase or decrease the position according to their views.

Case study shown for illustrative purposes only. This is not meant as a guarantee of any future result or experience. This information should not be relied upon as research, investment advice or a recommendation regarding the iShares Funds or any security in particular.

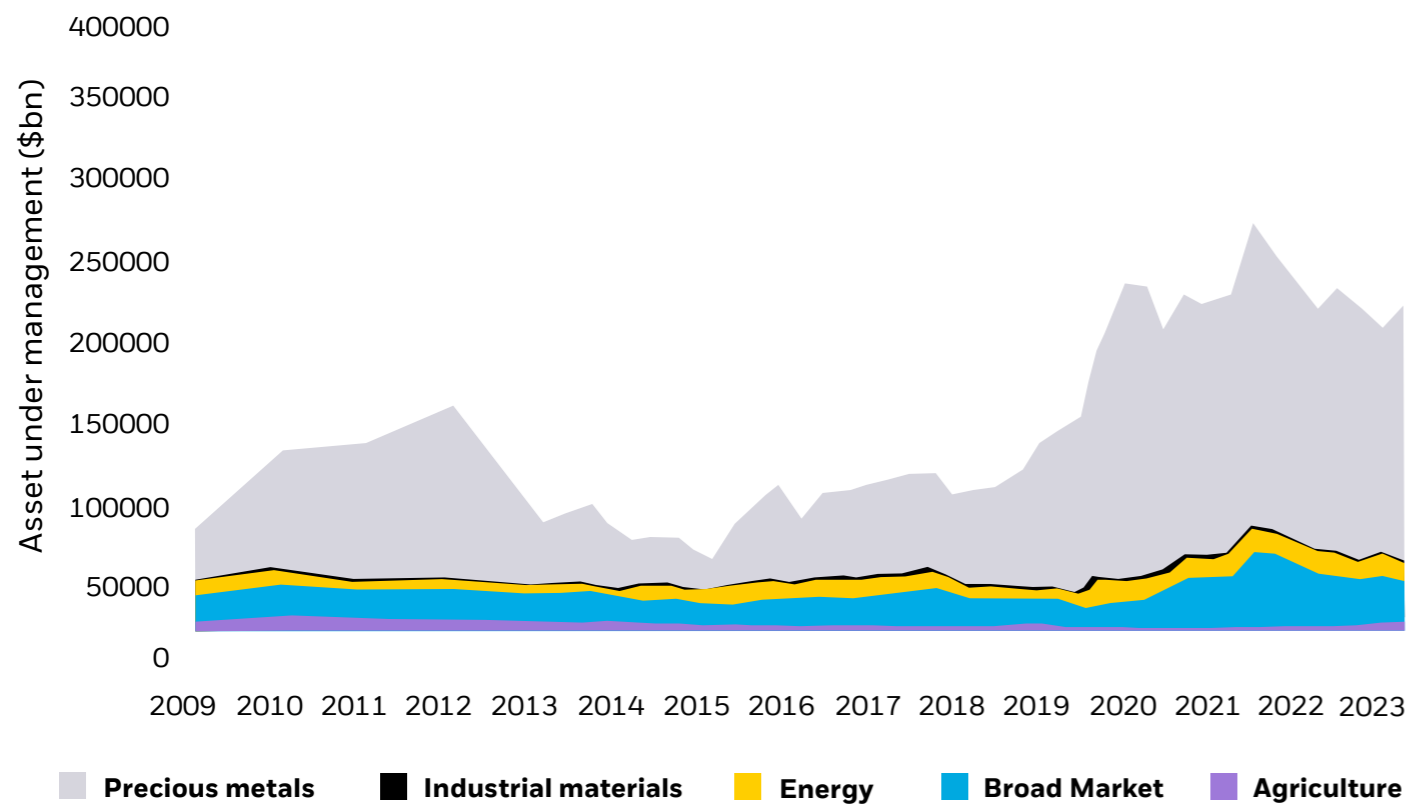
4.3 COMMODITIES ETPs

Commodity exchange traded product (ETPs) assets under management have climbed quickly in recent years as investors embrace the benefits of on-exchange trading.

An asset owner might have traditionally held physical gold - ETPs offer an alternative way to gain exposure to gold that may also be worth considering.

Growth is golden

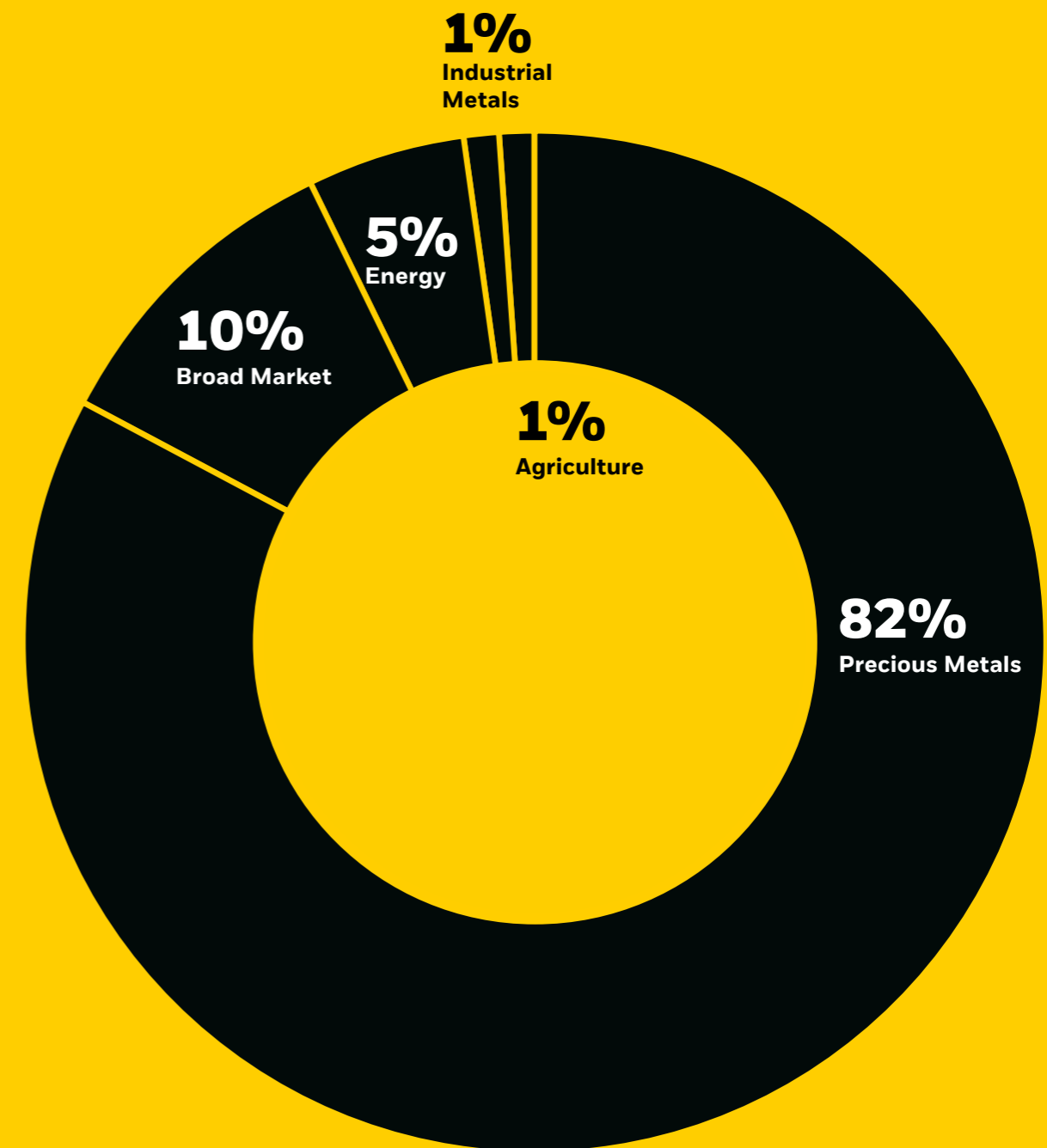
The global universe of commodity ETPs is worth US\$271B, with the vast majority of commodity assets made up in precious metals (gold).¹³



¹³ Source: BlackRock, 31st December 2023.

Global Commodity ETPs, AUM breakdown¹⁴

Physical gold Exchange Traded Products (ETPs) are by far the most popular commodity strategies with global investors. In fact, the assets under management in gold ETPs exceeds the gold holdings of many individual asset owners (excluding the U.S. Federal Reserve).



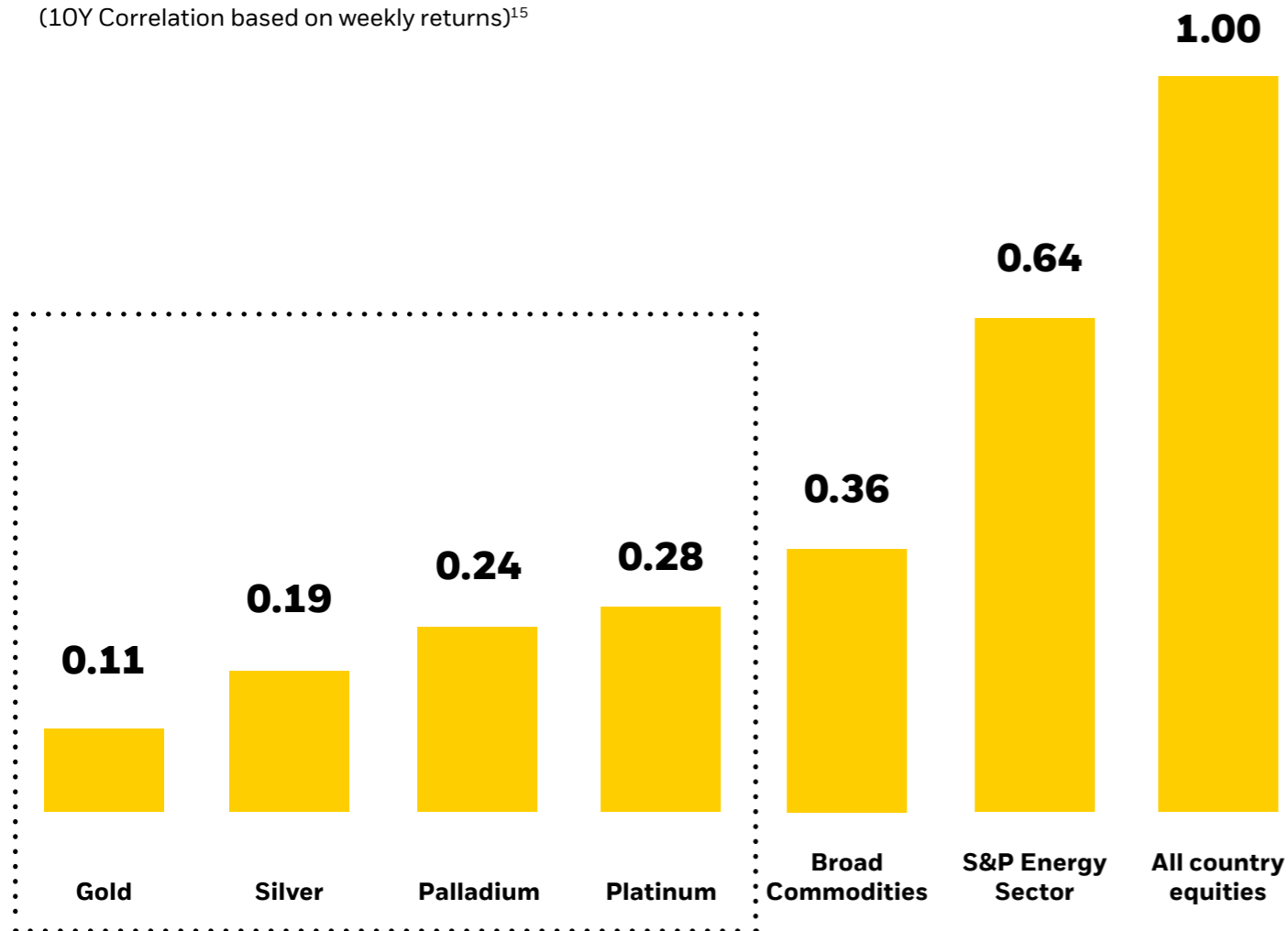
¹⁴ Source: GBI, January 2024

Consider the graph below displaying the value of gold positions of Gold ETP investors (\$USD billions).

Individual commodities exhibit a relatively high dispersion of returns due to varying industrial uses, seasonality, and supply/demand dynamics. Precious metals offer a low correlation relative to equities, often sparking demand during periods of volatility.

Commodities correlations

(10Y Correlation based on weekly returns)¹⁵



15 Source: Bloomberg, 31st December 2023. **The figures shown relate to past performance. Past performance is not a reliable indicator of current or future results.** Performance is for illustrative purposes only. Index performance does not reflect any management fees, transaction costs or expenses. Indices are unmanaged and one cannot invest directly in an index.

Distinguishing between commodity ETP structures

ETPs are easier to trade than physical commodities or futures. Since there's no need to transport and store bars of gold or barrels of oil, the total cost of ETP ownership amounts to the bid/ask spread, this is the same as for any common stock.*

However, there are many different commodity ETP structures and prospective investors should familiarize themselves with, for example, whether an ETP holds a **(1)** physical commodity, and/or **(2)** a derivative such as a futures contract or swap. The structure and holdings of an ETP will determine its price sensitivity to spot commodity moves or futures-related supply/demand dynamics known as backwardation (positive roll yield) and contango (negative roll yield).

Commodities with an infinite shelf life, namely precious metals, lend themselves to physically-backed ETPs since storage costs are low and the product does not need to manage decay. Derivatives are chiefly used as the underlying holding in most broad commodity funds and those targeting perishable substances like oil.

All commodity ETPs are supported by a robust ecosystem that supports creations and redemptions. Indeed, authorized participants will deliver/receive underlying commodities in return for ETP shares, just as with traditional equity and fixed income products. Arbitrage ensures the net asset value of the ETP reflects the price of the underlying, minimizing premiums and discounts, and allowing the ETF to efficiently price in changes in the value of its holdings.

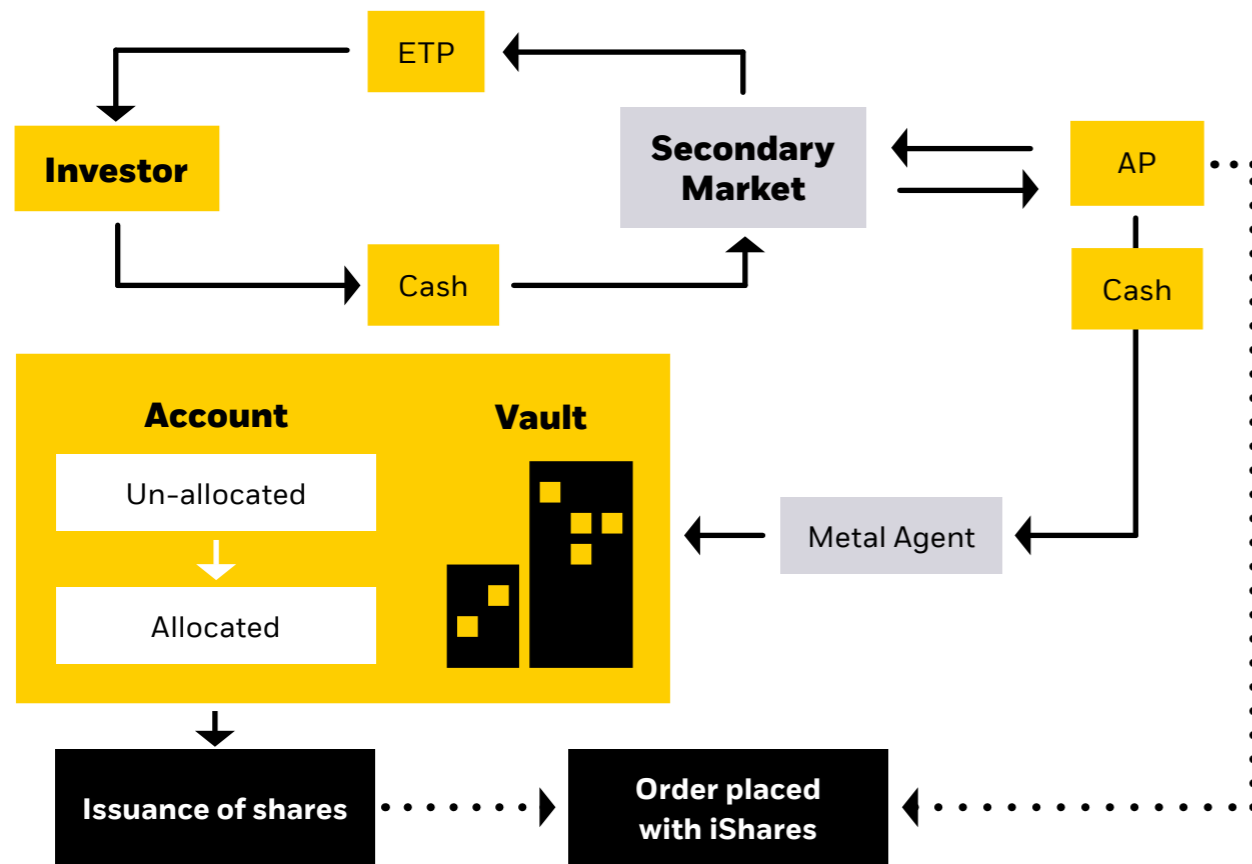
*There is also the annual management or sponsor fee if you use an ETP to invest in gold.

1

Physically-backed precious metals ETPs: A closer look at gold

Historically, gold prices have exhibited lower volatility vs. global equities during periods of market turmoil. This potential to absorb shocks means that incorporating gold into broader equity portfolios can help lower portfolio volatility and enhance the risk-adjusted return profile of the overall portfolio.

Physically-backed gold ETPs offer a low-cost and direct way to participate in the gold market without having to physically own and store the precious metals, or manage future expiry. Like an ETF, Exchange Traded Products (ETPs) are traded on exchange and shares can be created and redeemed by Authorised Participants. The value of the gold ETP securities is directly tied to the price of gold, with each share representing a specific quantity of gold. The underlying gold holdings are usually stored in secure vaults and audited regularly.



For illustrative purposes only.



Exposure

Gold ETPs can offer investors the exposure to the **day-to-day movement of the price of gold bullion minus fees and expenses.**



Security

There are Gold ETPs which are **100% physically backed ETPs** and hold all metals in secure, segregated, allocated storage including fractional bars. Gold bullion can be held in a custodial bank in their **London** and/or **New York** vaults.



Quality

For extra diligence, an asset owner might want to check that the Gold ETPs they have selected meet The London Bullion Market Association (LBMA) Good Delivery Rules. This ensures bullion bears the stamp of an approved refiner and conforms to required **purity levels.**



Cost efficiency & access

Gold ETPs may be cost efficient alternatives over physical or futures based exposure to precious metals. ETPs are **listed on exchange**, providing intra-day pricing, **liquidity & transparency**, and can be purchased and sold through traditional brokerage accounts.



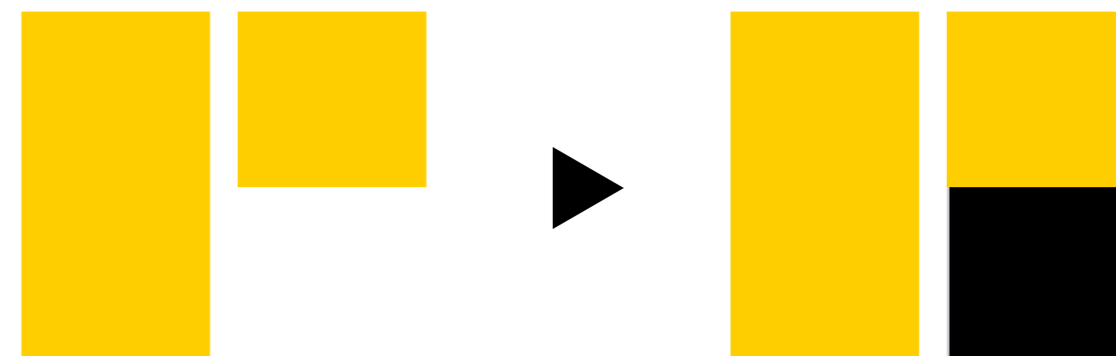
iShares can have an advantage for precious metals exposure

Allocated & Segregated Account

Metal backing the ETP securities is held in a secured and allocated account. Physical metal in the allocated account is **separately identified to the asset of the custodian**. In the event of a default by the custodian, the gold held in the secured allocated account will be identified separately from the asset of the custodian. Any gold in the unallocated account would be exposed to the credit risk of the custodian (and any sub-custodian).

Over-allocation mechanism

When the creation does not match a whole number of bars, one extra bar is allocated in the allocated account to protect investors and avoid metal in unallocated form.



Not all providers have allocated storage for fractional bars, which means that for this fractional bar, the issuer would need to join the list of general creditors who have a claim on the metal in the unallocated storage vault.

Not all structures share the robustness that is built into iShares products. Investors need to be comfortable that their provider has correctly established them through **private contractual arrangements**.

Strong creation & redemption process

To ensure a strong creation process, ETP shares will only be issued when the physical metal is transferred to the allocated account. This ensures that the shares are always physically backed by allocated metal.

This thorough process cannot be assumed for all products as some issuers can issue the securities on the back of unallocated metal.

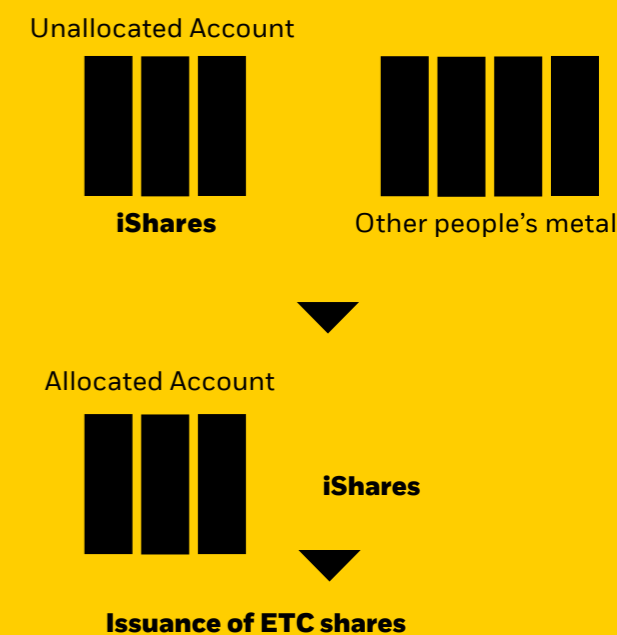
Transparency

The list of metal bars in the vault are published daily on iShares.com (serial numbers, purity information, refiner, vault location).

Metal Quality

Only metal that meets the London Bullion Market Association (LBMA) Good Delivery Rules will be accepted.

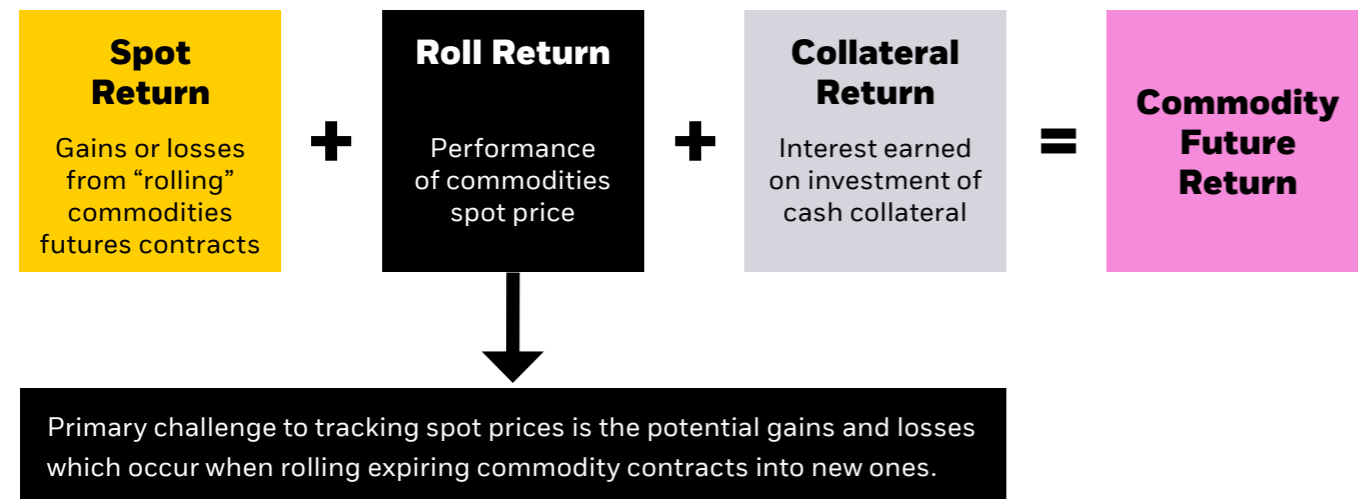
Creation



2

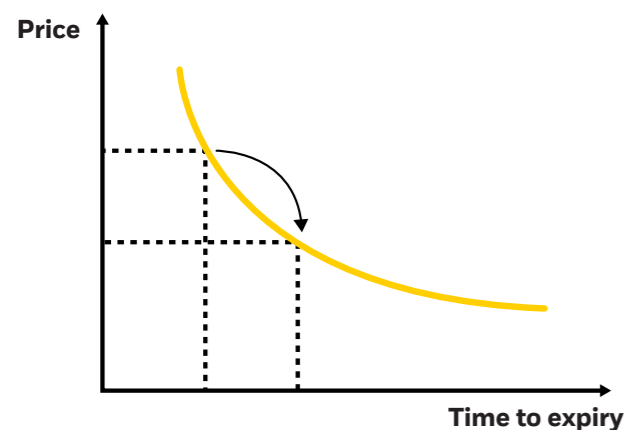
Derivative-based commodity ETPs: Product structure and considerations

Unlike some precious metal funds where asset managers can store the underlying asset in a vault, ETPs tracking industrial commodities can own derivatives contracts to replicate the underlying index.



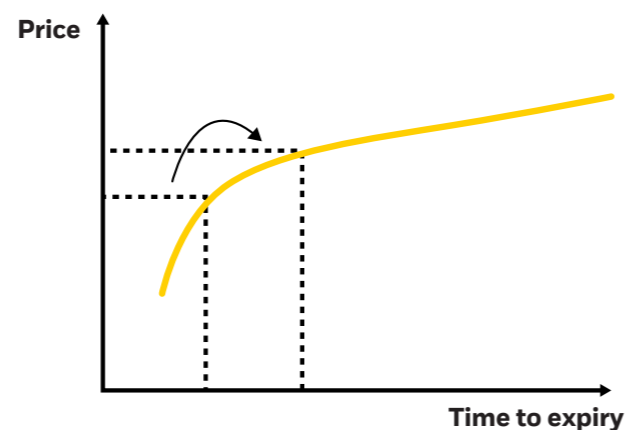
Backwardation

- An expiring contract is sold and longer-term contract is purchased at a lower price
- May positively impact a long position in futures contract



Contango

- An expiring contract is sold and longer-term contract is purchased at a higher price
- May negatively impact a long position in futures contract



For illustrative and educational purposes. Not a recommendation, offer or solicitation to buy or sell any securities or to adopt any investment strategy.

Negative oil prices in 2020

Case study

An oil price shock related to the COVID-19 pandemic carried the futures price of U.S. oil into negative territory, bringing into sharp focus the treatment of index replication and the hedges used to manage ETPs that use futures.

Many derivative-backed ETPs seek to replicate an index by holding the futures contract nearest to expiry, these are known as "front-end contracts". ETP losses can occur when contango is present. (i.e. when spot price for oil is less than the future delivery price of oil). Effectively, this market condition means that the product is effectively buying high and selling low indefinitely.

Ahead of the front-month futures expiry, an ETP manager may have to sell front-month contracts at a lower price to buy next month's contract at a higher price to maintain exposure.

With the glut of oil in May 2020, and no immediate storage capacity, U.S. oil futures contract went negative in price, an unprecedented occurrence. Contango reached over USD50 per barrel between adjacent delivery months. The greater the number of oil ETPs which were predominantly positioned at the front of the futures curve, the more exposed to 'rolling futures losses' would be evident each month. At this point the ETPs' returns might substantially diverge from the underlying commodity index, because the potential investment returns need to be absorbed by the rolling of contracts.

Ironically as the oil price fell, more investors might be attracted to an ETP, and the shares outstanding in the ETP could increase accordingly. Subsequently the amount of futures contracts underlying the ETP needing to be rolled would be larger, resulting in an increasing unstable situation. i.e. Investors wanting to be long the commodity via an ETP, but not ultimately wanting delivery, and the underlying hedge needing changed.



Did you know?

An Oil ETP had a tracking difference of +/- 1.75% between 2015 and 2019 to the Bloomberg WTI Crude Oil Subindex = BCOMCL index.¹⁷

12%

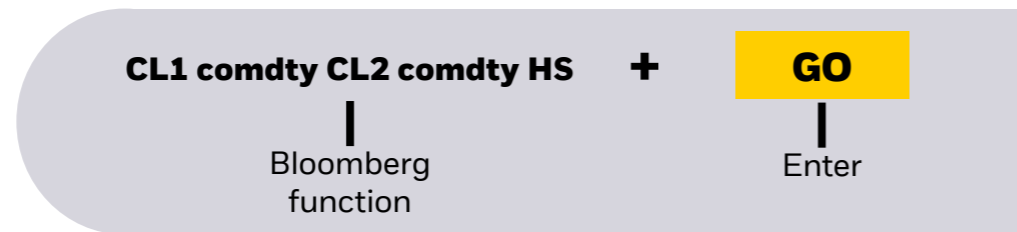
But in the first 8 months of 2020, the oil ETP suffered a 12% an underperformance to the underlying index because of the expensive rolling costs associated with contango.

17 Source: Bloomberg, 31st July 2020. **Capital at risk.** You may get back less than you invested. Case studies are for illustrative purposes only; they are not meant as a guarantee of any future results or experience, and should not be interpreted as advice or a recommendation.

The COMDTY <go> function

Generic spread between front/first month (black) and next/second month (white) of NYMEX WTI Crude Oil Futures. Negative value shows extent of the lower price differential of the near month relative to the next month contract delivery.

Alternative keystrokes¹⁸



18 Source: Bloomberg, as of 31 July 2020.



Overview and potential impact of commodities futures 'rolls'

Certain ETPs hold commodity futures contracts because most investors do not want, and are not capable, of taking delivery of a few thousand barrels of oil, for example. Instead, ETPs will sell or 'roll' their contract each month by liquidating the near-term contract to fund the purchase of a later-term contract.

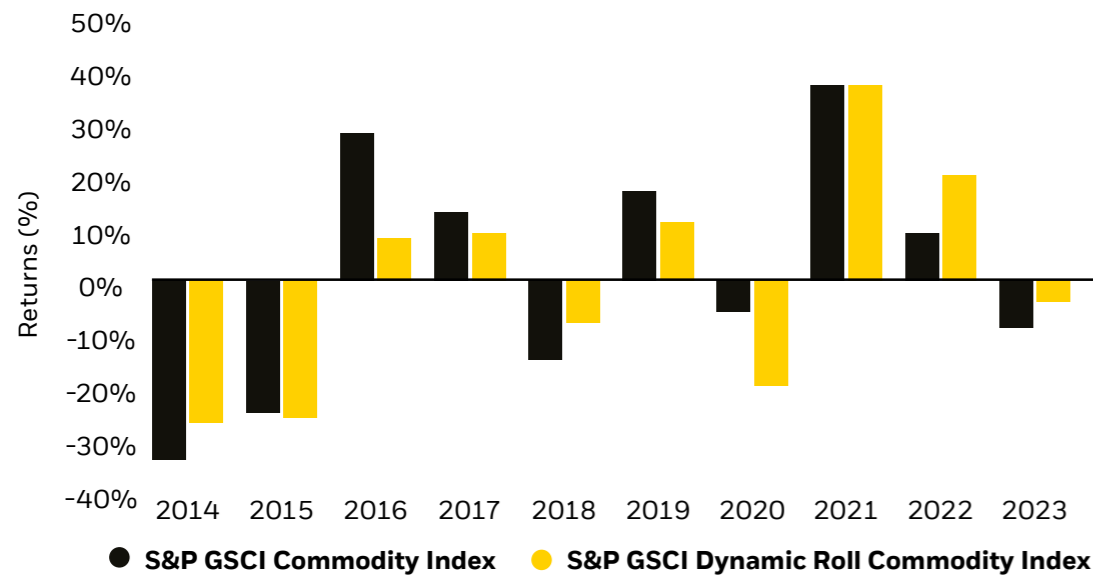
Since the future is exchangeable for the physical commodity when it expires, the price of the future is expected to converge with the spot price. For this reason, certain ETPs, whose objective is track movements in the spot price, will simply buy and sell the contract nearest expiration, this is known as 'rolling' to the front month contract.

Roll costs can be higher in the front month, and this cost will degrade the net asset value of the fund over time. To counter this pricing reality, some ETPs offer dynamic hedging where the underlying commodity exposure is replicated using a variety of front and back months to mitigate the front month futures contract roll problem.

Dynamic and selective futures roll strategies have the ability to help reduce roll costs and support performance.

Annual performance of S&P GSCI Commodity index¹⁹

The chart below shows the annual performance of the spot vs the dynamic roll commodity index. The S&P GSCI index is widely recognised as a leading measure of general price movements and inflation in the world economy. It provides investors with a reliable and publicly available benchmark for investment performance in the commodity markets.¹⁹



19 Source: Bloomberg, BlackRock, 31st December 2023. **Index performance is for illustrative purposes only. Index performance does not reflect any management fees, transaction costs or expenses. Indices are unmanaged and one cannot invest directly in an index. Past performance does not guarantee future results.**



**BLOOMBERG
ANALYTICS 5**

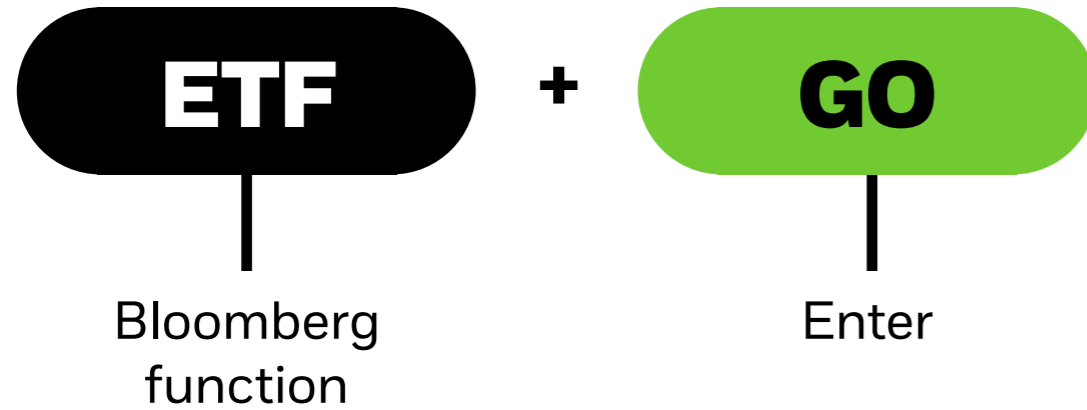
5.1 ETF BASICS ON BLOOMBERG

ETFs typically provide exposure to a diversified basket of securities. This enables investors to achieve beta objectives, while offering the potential to mitigate headline risks associated with more concentrated exposures.

There are several functions on Bloomberg that allow investors to look under the hood of an ETF for visibility into the fund's composition, characteristics, and risks.

The ETF function

The ETF <go> Bloomberg function provides an overview of ETF details – such as flows and yields – within specified criteria.



For illustrative purposes only.

iShares tip: Be mindful of the premium or discount throughout the trade execution window and adapt as necessary.



ETF

Class	Assets (MLN USD)	Fund Assets (MLN USD)	Expense Ratio	YTD Return	12M Yld	300 Vol	YTD Flow	1M Flow
Sum	861,400.50	2,164,776.71	113.14%	+2845.19%	+1261.5%	234,643,846	+112,650.73	+7,440.32
ETF 1	101,452.30	101,452.30	0.03%	+5.65%	+3.13%	9,392,001	+16,614.67	+2,830.07
ETF 2	51,626.58	51,626.58	0.15%	+2.77%	+3.38%	46,432,646	-24,752.63	-2,191.36
ETF 3	31,862.36	31,862.36	0.14%	+9.40%	+3.99%	21,175,522	+4,887.85	-226.36
ETF 4	28,731.40	28,731.40	0.04%	+5.01%	+3.40%	2,708,082	+4,792.52	-1,314.86
ETF 5	27,650.29	27,650.29	0.15%	+3.64%	+2.91%	11,853,128	+4,003.05	+663.23
ETF 6	25,640.02	25,640.02	0.15%	+4.16%	+2.99%	5,702,839	-2,316.55	-1,723.02
ETF 7	23,788.82	23,788.82	0.06%	+6.23%	+3.46%	2,244,119	+4,003.05	+663.23
ETF 8	22,657.82	22,657.82	0.05%	+4.17%	+2.65%	11,601,595	+300.25	-1,122.58
ETF 9	21,458.97	21,458.97	0.04%	+6.40%	+3.26%	4,026,307	-2,250.93	-89.89
ETF 10	18,797.35	18,797.35	0.49%	+11.53%	+5.74%	35,010,692	+2,225.87	+1,645.90
ETF 11	18,606.13	18,606.13	0.15%	+5.04%	+4.73%	2,624,260	-1,476.88	-1,476.65
ETF 12	18,591.11	18,591.11	0.19%	+3.81%	+2.73%	3,096,442	-4,171.49	-1,371.30
ETF 13	17,516.11	17,516.11	0.07%	+5.12%	+4.87%	3,218,033	+10,071.80	+180.54
ETF 14	16,501.50	16,501.50	0.39%	-10.60%	+4.74%	6,277,335	+1,273.06	+1,405.35
ETF 15	15,209.11	17,949.36	0.20%	+7.41%	+2.51%	90,596	+4,564.43	-82.84
ETF 16	13,661.05	13,661.05	0.46%	+9.20%	+6.63%	4,838,395	-459.68	+306.93
ETF 17	12,990.88	12,990.88	0.15%	+4.42%	+2.36%	2,396,802	+983.69	-10.14
ETF 18	12,300.39	12,300.39	0.04%	+9.22%	+3.78%	2,008,067	+1,887.44	+364.07

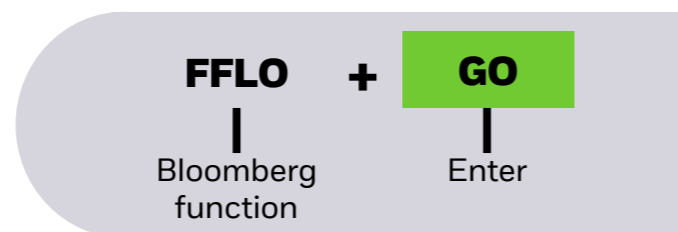
For illustrative purposes only. Represents time period of 1st January 2023 to 31st December 2023. Only iShares ETFs showing in this illustration. Other ETF providers are excluded from this list. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a BFCs asset group** Allows choice of asset class. 'Global Fixed Income' and 'Domestic Fixed Income' selected. Domestic = US.
- b BFCs and other categories** Not selected in this example, but allows for category type.
- c** Further classifications available in this section are geographical focus, strategy, issuer, SFDR classification, rating, maturity etc.
- d Issuer** Allows to search by ETF provider. The illustration shown is currently only showing BlackRock iShares.
- e Sum** In this example aggregate figures in 'sum' line only reflect iShares, and not industry flows.
- f Flows** Explore flows over periods of time. The 'sum' line above the individual ETF information gives summary also. Year to date flows in these fixed income categories = USD 112.65 bn (1st January 2023 to 31st December 2023). This column is the sum of creations and redemptions. The flow tab allows more detail.
- g Noteworthy flows** [ETF 2] a long maturity Bond ETF has seen \$24.75 bn of inflows year to date.
- h ETF AUM** [ETF 1] a broad category fixed income has \$101.45 bn in assets
- i Primary share classes filter** This function is useful for UCITS funds when searching at fund level and aggregated assets of individual share classes. Alternative search method click on 'all filters' >> Descriptive info >> Share Classes >> Include Secondary Share Classes? >> NO.

The list above is currently ranked by assets under management. Other criteria can be ranked according to user preferences, such as YTD return and fund flows. The ETF <go> search function can include all ETF sponsors but for the purpose of this publication other providers ETFs have been blanked out. However, the aggregate numbers include them.

The FFLO function

The FFLO Bloomberg function provides a high-level overview of ETF fund flows by asset class.



FFLO



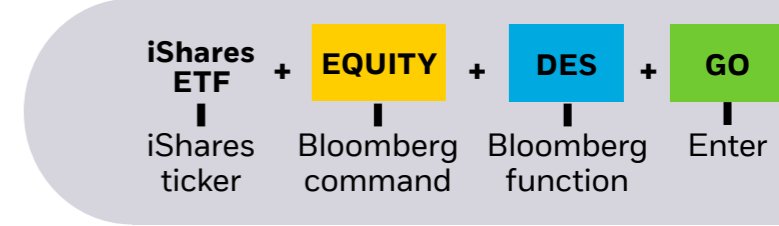
For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** Select “BFCF asset class” or “country” region
- b** Select “All” markets
- c** Selected desired time period: Year-to-date (1st January 2023 to 13th May 2023) selected in this example
- d** Total flows for asset class during the selected period: Total flows for asset class for this period. For the selected period YTD fixed income flows were + \$110.824 bn. It is important to note that flow is creation or redemption of assets, not secondary turnover, which is invariably a much higher number (see page 80 for definition of fund flow and value traded for individual ETFs).
- e** Subcategory flows: Net flows for investment grade bond ETFs have been positive, with no fixed income category showing outflows, except for high yield.
- f** Left click on the pencil to change search criteria: Users can search by rating, maturity, or strategy.

For illustrative purposes only. Represents time period of 1st January 2023 to 13th May 2023. Some emerging markets appear under “not declared” category.

The DES function

The DES Bloomberg function provides a view of an ETF’s composition and key metrics. All ETFs—even bond funds—are given an equity ticker on Bloomberg.



DES

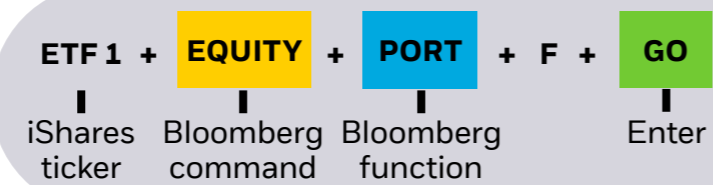


For illustrative purposes only. As at 29th December 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** An iShares ETF capitalisation: \$101.5 bn is the total value of all the ETF’s outstanding shares, stated in the pricing currency. The market cap is calculated by multiplying the last price of the ticker by the shares outstanding.
- b** Expense ratio: 0.03%, deducted from the NAV on a daily basis. For example, if ETF 1 is held for 120 days, we would expect the NAV to drop by $(120/365) \times (0.03/100) = 0.009863\%$
- c** Holdings tab: Underlying security holdings
- d** NAV: Published at prior day close
- e** Appropriations: **Actively managed:** The vast majority of ETFs are passive replications although recently there are an increasing number of ETFs with active replication strategies. **Swap based:** If yes, derivatives/swaps are used instead of physical securities to replicate the benchmark. The buyers should consider the underlying swap treatment. **Replication:** Whether the ETF manager uses optimization or full replication strategies to track the index. **Securities lending:** If underlying securities in the ETF are lent, a split of lending revenues accrue to the ETF.
- f** Shares outstanding: This is the number of ETF shares currently in issuance.
- g** Total assets: Total assets are provided by the fund company or administrator and represent the total fund size. The total assets may not equal market capitalisation.

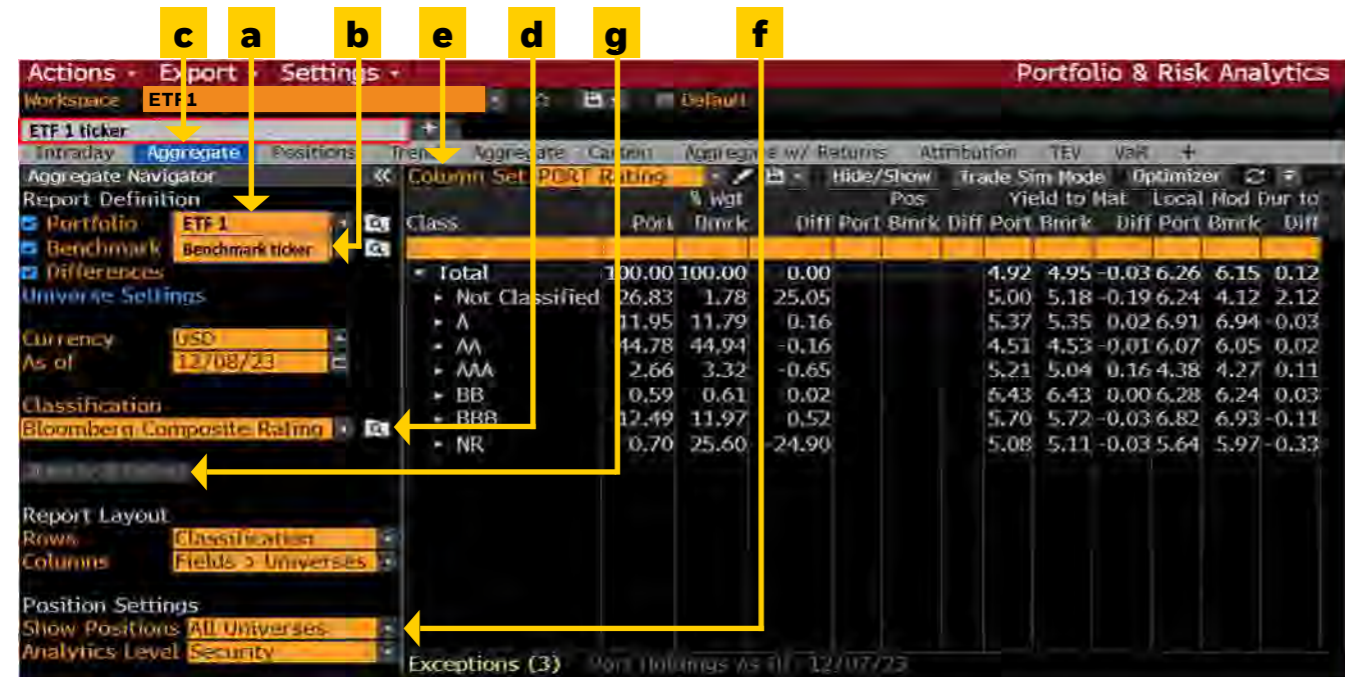
The PORT function

The PORT <go> function allows a detailed analysis of the underlying bond portfolio. One useful view it provides is the ratings breakdown of a bond ETF.



Most ETFs do not have a credit rating at fund level, but the ratings of the ETF's underlying assets should be readily observable.

PORT



For illustrative purposes 14th December 2023.

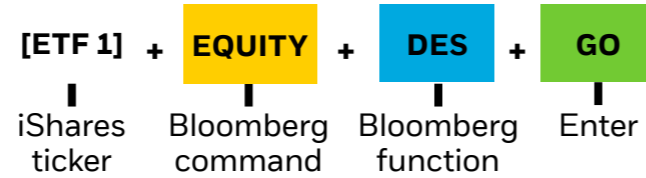
Using the PORT <go> function to view the credit ratings breakdown

- a** **Select the iShares fund** In this example, the investor selects [ETF 1].
- b** **Select 'benchmark' index or fund for comparison.** The default is the ETF's underlying index (if available).
- c** **Select Aggregate tab** -
- d** **Classification. Left click arrow to select for fund/benchmark comparisons** The investor selects Bloomberg Composite ratings. Other providers rating screens are available.
- e** **Column set** Select preferred view. Here showing a customised setting 'PORT rating'.
- f** **Position settings** Left click arrow to show positions. Portfolio = ETF. Benchmark = index All universes = both. All universes = both.
- g** **Apply and reload** To see results.

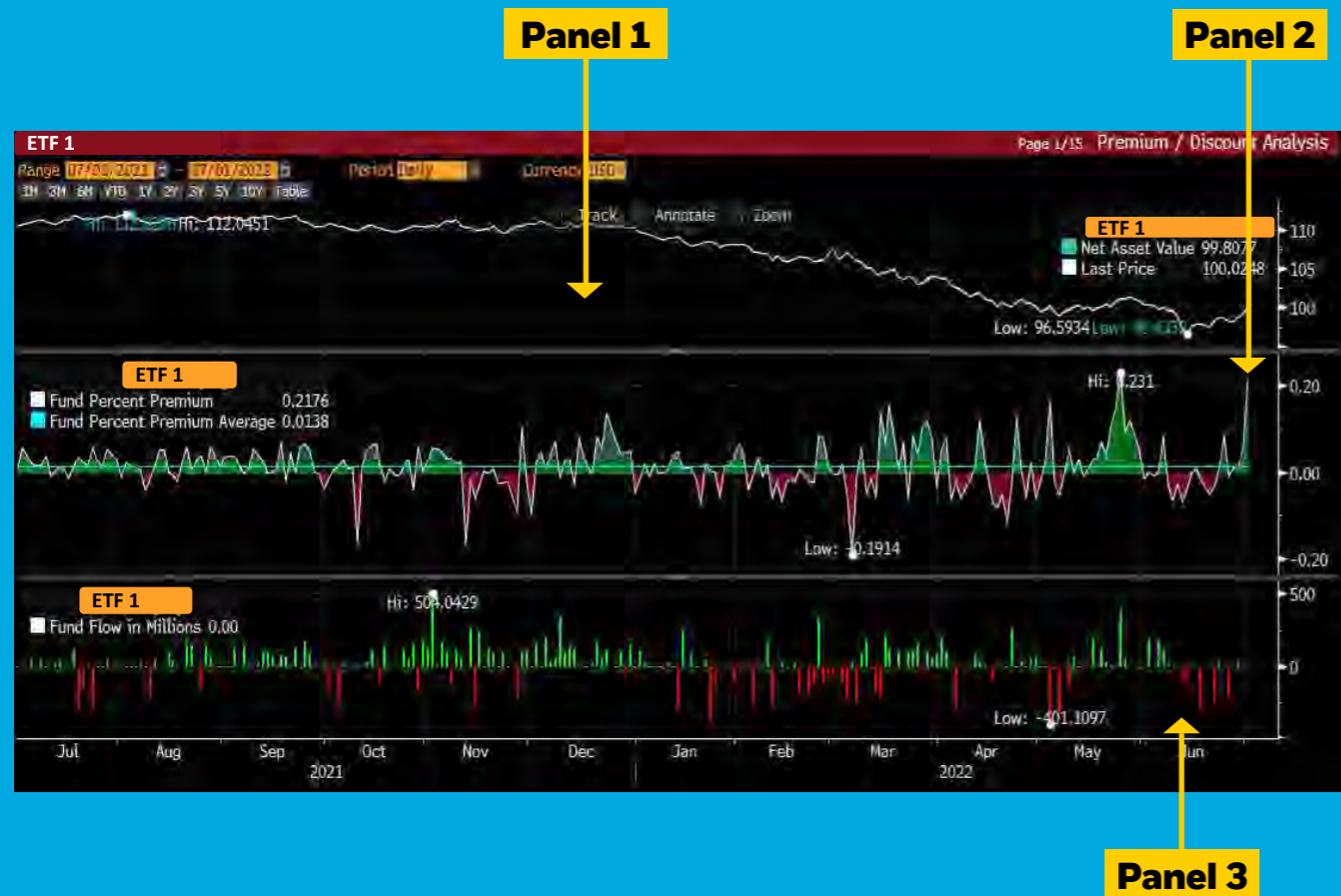


The NAV function

The NAV Bloomberg function allows investors to view whether an ETF is trading at a premium or discount to its NAV. It also shows fund flows.



NAV



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Panel 1

Closing price of the ETF superimposed on the NAV

- The NAV of an ETF is required to be published once a day (typically at the end of trading in the underlying markets) by a 3rd party (typically fund custodian).
- A bond ETF's NAV is based on the underlying bond prices as provided by the underlying index provider.
- These bond prices are derived from actual trades, or estimated based on bonds that have comparable issuers, sectors, or other market metrics.
- The value of the individual bond positions (pricing x notional units held) are then added up along with any net cash holdings.
- The total sum is then divided by the number of ETF units outstanding to get the NAV per unit.
- For corporate bond ETFs, the pricing (index marks) are typically based on the bid-side of the underlying bonds. Equity ETF pricing is based on the closing price of the underlying stocks.

Panel 2

The percentage difference between the ETF price and NAV

iShare's 1 price premium over NAV was higher on the 1st July 2022 than the 1st July 2021. Further in this chapter, we explore how the price return of an ETF in any intervening period can be different from the NAV return.

Most of the time, the price of iShare's 1 trades at a narrow premium to NAV given the bid-side valuation of the ETF. The iShare1 fund premium over NAV from 1st July 2021 - 1st July 2022 averaged 0.0138%.

Panel 3

Fund flow (creation/redemption activity)

- Green = fund inflow = creations
- Red = fund outflow = redemptions
- Expressed in USD millions.

When an ETF's closing price and NAV are struck at different times

The NAV function compares an ETF's closing price with its underlying closing NAV. If these prices are struck at different times, any market moves can cause discrepancies between the two pricing points.

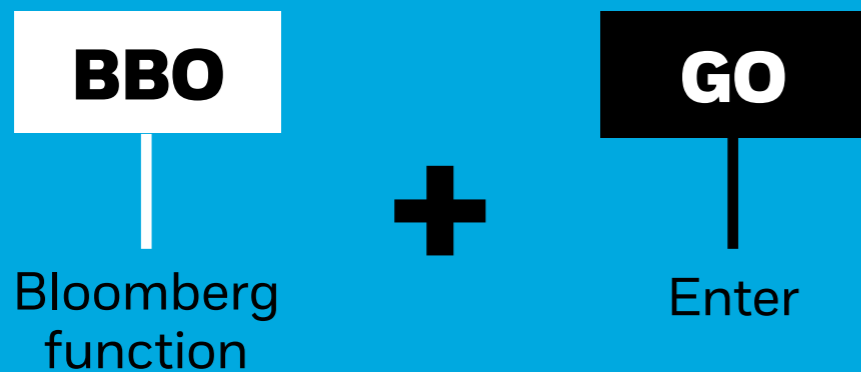
5.2 ETF TRADING ANALYTICS

It is important for ETF investors to develop an understanding of ETF liquidity and how they trade. Bloomberg offers several useful functions for ETF trading analytics.

The best bid or offer (BBO) function

The Bloomberg BBO function is the exchange order book where buyers and sellers meet in the marketplace. There is a different order book for every exchange-traded security.

This provides a useful reference point to see live prices and trading volumes. However, it only gives direct buy and sell access to exchange participants.



For illustrative purposes only.

BBO

The screenshot shows the Bloomberg BBO interface for [ETF 3]. It includes a settings bar at the top with '95) Settings' and 'Market Depth Monitor'. Below is a table with columns for Exchange, Time, Total, Mmkr, Size, Bid, Ask, Size, Mmkr, Total, and Time. The table shows multiple rows of bid and ask orders from various exchanges like EDGX, NYSE, EDGA, and NSDQ. At the bottom, there are summary statistics like WVAP (129.0989), Beta (1.145), and % Change (+.37%). A pie chart on the right shows volume distribution by exchange: FINR (56.59%), NSDQ (13.47%), ARCX (10.09%), HAIS (5.73%), and Oth. (11.12%).

For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The above example shows the order book for [ETF 3] = an investment grade corporate bond ETF. Size is expressed in hundreds, such that 1=100.

In this example, a buyer on the exchange could buy 2,800 shares on [ETF 3] offer side at a price of \$129.03 for a total of \$3,612,840.00.

The buyer could move up the price/volume scale accordingly. Sellers, on the other hand, could move down the price/volume scale.

If the order was 4,500, an exchange buyer could buy:

- 2,800 at \$129.03
- 1,700 at \$129.04

Using the bond ETF order book as a guide

When looking to make a bond ETF trade, asset owner can ask a market counterparty for an OTC price and use the BBO exchange prices as a price discovery reference point.



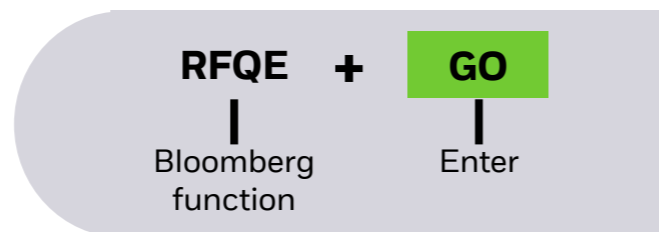
See next page for 'Request for Quote = RFQE'

The RFQE function

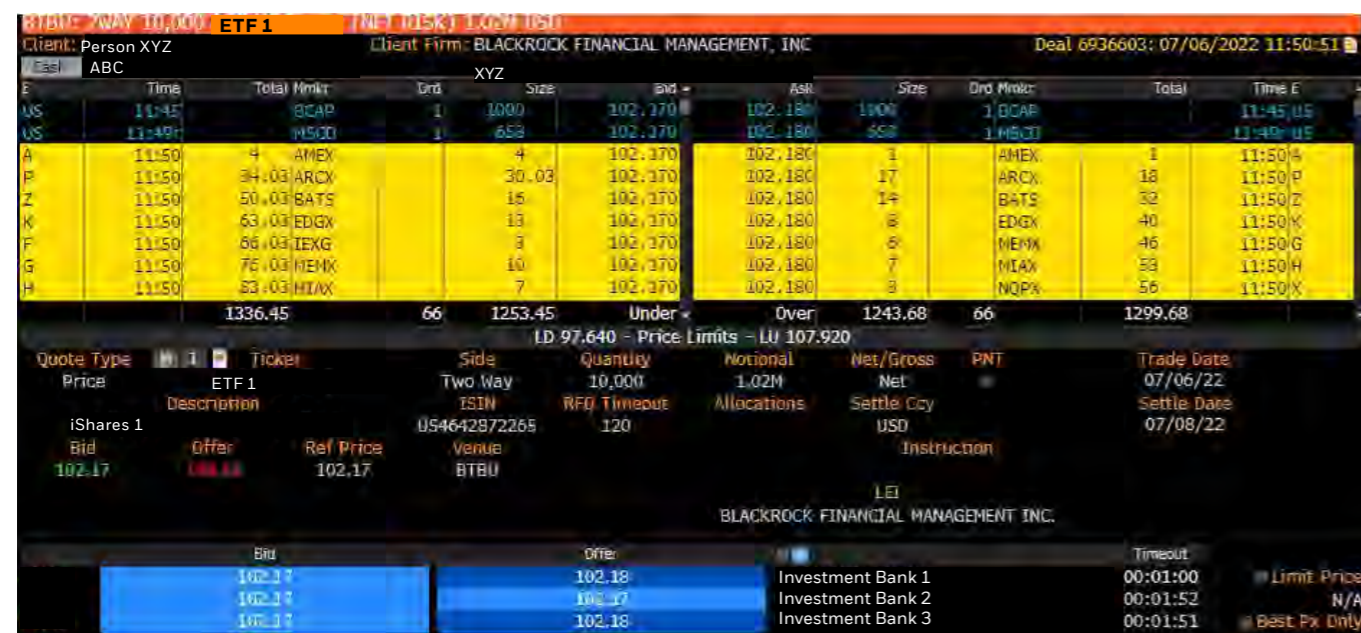
Bloomberg offers an Request for quote (RFQ) function, which is one of the common ways for institutional investors to put multiple investment banks/brokers in competition for trades on an OTC basis.

With this function, it is possible to trade:

- On risk immediate execution
- Benchmarked to NAV



RFQE



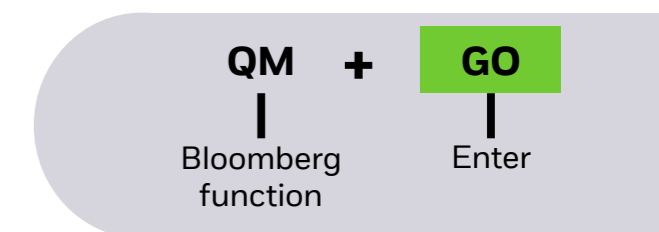
For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.



For more information on how to access RFQE, contact your **Bloomberg representative**.

The quote montage (QM) function for U.S. ETFs

The QM <go> Bloomberg function enables investors to view all the trading venues and platforms where a given ETF trades. U.S. and European ETF trading ecosystems differ materially. The following is an example of the QM function for a U.S.-listed bond ETF.



QM

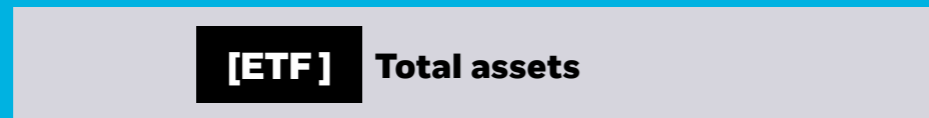


For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a Parent ticker [ETF 1]** The default is the ETF's underlying index.
- b Fund identifier (ISIN)** Left click on the arrow to the left to expand regional exchanges.
- c Regional exchanges** A client order could be executed on any of the regional exchanges. In addition, there are condition codes to inform the nature of the trade (i.e. 'out of sequence', 'derivative' etc.). The U.S. has a 'national best bid/offer' policy which guarantees the best price across all the exchanges in the U.S.

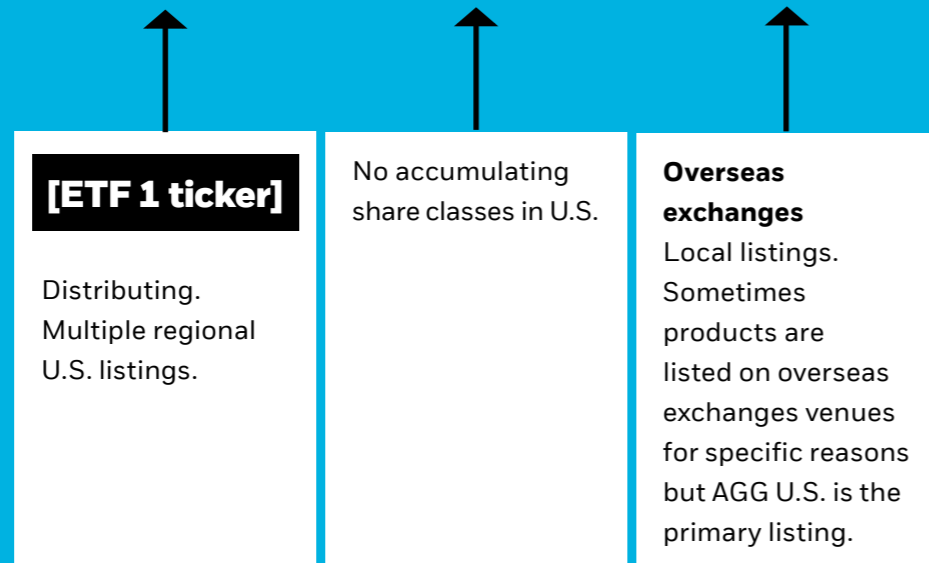
Diversification of trading across exchanges/platforms - U.S. example

FUND LEVEL

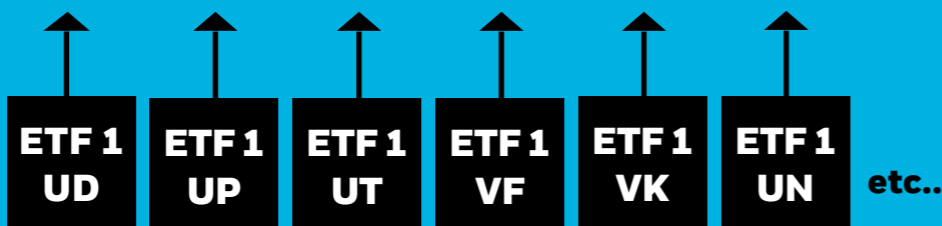


LISTINGS LEVEL

The concept of share class does not exist in the U.S. iShare range.



REGIONAL LISTINGS LEVEL



The QM function for European ETFs

European ETFs trade across a broad and diverse ecosystem. In Europe, it is possible to have share classes of the same fund, where each have different ISINs. This concept does not exist in the U.S. As show below, left clicking on any arrow to the left of the ISIN reveals its trading venues.

QM

Ticker	V	D	S	W	Time	Volume	%	Avg Vol 5D	%	Avg Vol 10D	%	Avg Vol 20D	%
ETF 4 isin						2.00k	.06	1.00k	.03	500.00	.02		
ETF 4 isin						2.39M	77.75	2.68M	83.25	2.06M	77.18		
Europe - CHF						142.20		317.50	.01	257.15	.01		
Europe - EUR						2.39M	77.74	2.68M	83.24	2.06M	77.16		
Europe - GBP						269.20	.01	160.40		214.45	.01		
Europe - GBp								4.10		58.95			
Tier 1 - GBp								4.10		58.95			
ETF 4 isin GBP hedged						6.34k	.21	12.66k	.39	142.70k	5.35		
ETF 4 isin EUR accumluating						652.04k	21.19	507.07k	15.78	443.98k	16.66		
ETF 4 isin SEK hedged										1.27k	.05		
ETF 4 isin CHF hedged						24.13k	.78	17.62k	.55	19.87k	.75		

For illustrative purposes only. Represents time period of 1st January 2021 to 26th May 2023.

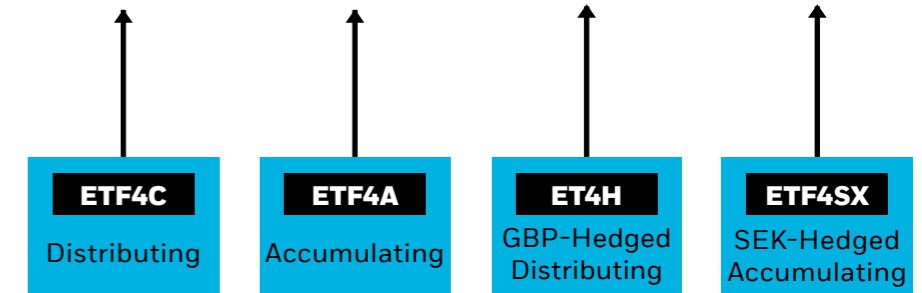
Diversification of trading across exchanges/ platforms - European example

Fund level

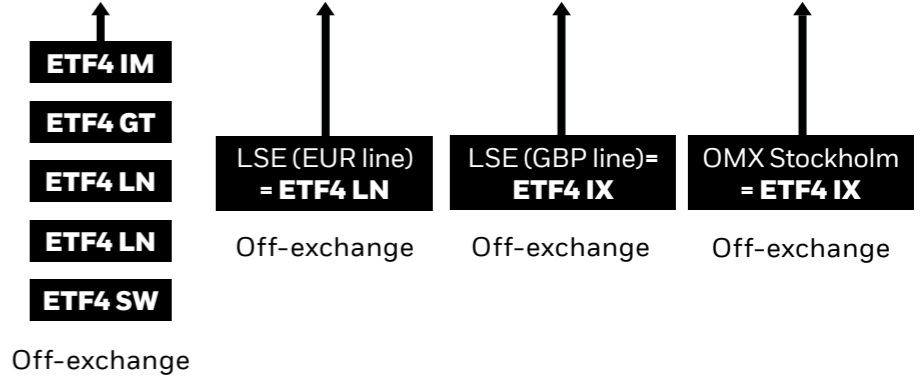


Share classes

ETF market makers can switch across share classes at nominal transaction costs.



Trading venues



Source BlackRock. For illustrative purposes only.

- a** **ETF4** The International Securities Identification Number (ISIN) specific to this share class.
- b** **ETF4 EU** This is a Bloomberg construct (not executable) that measures aggregated trading volumes across multiple venues.
- c** **ETF4 WT and ETF4 T2** These are Tradeweb multilateral trading facilities (MTFs), also known as off-exchange trading platforms.
- d** **Tier 1 EUR, ETF4 GR etc.** These are listings on different exchanges. Tiering is based on the first four letters of the fund (page shown is truncated). In this case, the ETF4 LN (under the EUR tier) is the most common ticker and trades in EUR on LSE. It also trades on other exchanges/ in other currencies, where it may be known under a different ticker (e.g. ETF4 GT).
- e** **Parent ticker** Bloomberg may designate a 'parent' ticker in light blue. This a bloomberg designation only.

Shortcut:



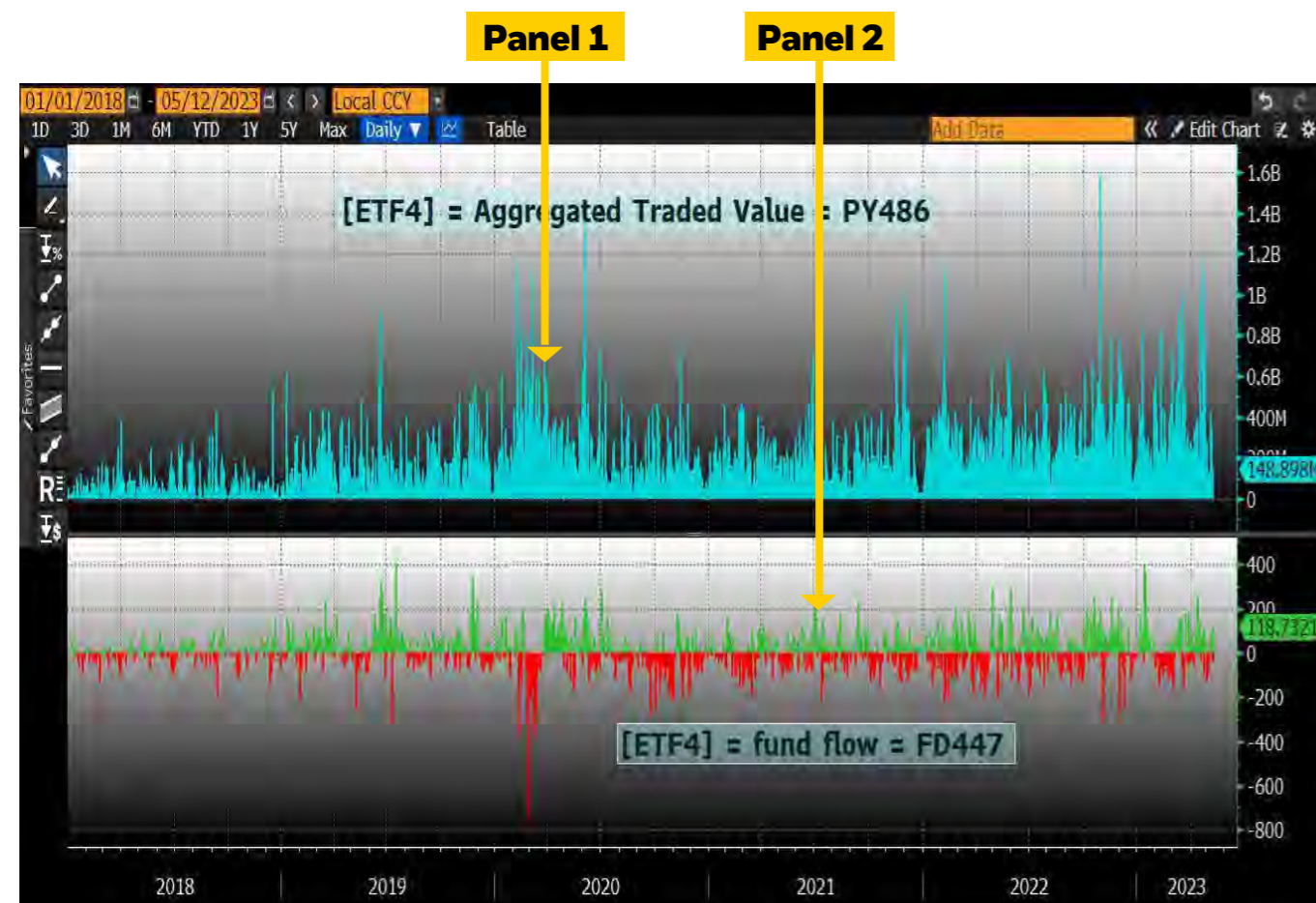
ETF 4 TICKER | AT 115,580 +0,080 | 115.480 / 115.530L | 50x8628
ETF 4 | Vol 39,174 | D 115,550L | H 115,580L | L 115,400L | Val 4.524M
ETF description | London EUR
ETF 4 isin | Europe - EUR
ETF 4 | Tier 1 - EUR

Ticker	V	D	S	W	Time	Volume	%	Avg Vol 5D	%	Avg Vol 10D	%	Avg Vol 20D	%
ETF 4 isin						1.65M	88.03	3.75M	56.55	2.86M	41.29	3.46M	58.07
Europe - EUR						1.65M	88.03	3.75M	56.54	2.86M	41.28	3.46M	58.06
EU					11:14	708.38k	37.74	1.09M	16.52	869.98k	12.56	798.99k	13.39
WT					11:12	22.58k	1.20	115.49k	1.74	102.38k	1.48	243.00k	4.07
X9					11/08/23	1.13k		326.60		386.70	-0.11	5.47k	.09
Tier 1 - EUR						710.61k	37.86	1.11M	16.70	884.18k	12.76	824.38k	13.82
NA					10:53	596.43k	31.77	810.55k	12.23	653.99k	9.44	548.28k	9.19
EB					11:10	39.17k	2.09	167.08k	2.52	111.95k	1.62	70.30k	1.18
T2					11:03	16.99k	.90	9.73k	.15	10.95k	.16	12.34k	.21
IM					11/08/23	15.64k		4.33k	.07	5.64k	.08	3.05k	.05
GR					09:57	14.94k	.80	14.55k	.22	16.42k	.24	27.58k	.46
LN					11:03	13.25k	.71	13.28k	.20	10.68k	.15	12.75k	.21
GR					11:06	8.90k	.47	58.56k	.88	51.40k	.74	115.83k	1.94
LN					10:45	1.82k	.10	2.36k	.04	1.34k	.02	1.67k	.03
LN					11:11	19.04k	1.01	21.25k	.32	17.32k	.25	28.93k	.48
LN					10:45	1.73k	.09	1.79k	.03	1.02k	.01	1.43k	.02
LN					09:58	87.00		346.80	.01	194.80		148.50	
LN					11:25	36.00		273.00		235.60		149.10	
LN					09:32	70.00		435.60		389.50		413.40	
Total						1.88M		6.63M		6.93M		5.96M	

For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Diversification of ETF trading across platforms

Across European and U.S. markets, measuring aggregate share volume/value traded requires different approaches. Below is an example of the European-listed 'EUR iShare 4' through a customized Bloomberg page.



As at 13th May 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Panel 1

Daily gross volumes

- The upper panel is a consolidated tape of [ETF4], showing total value traded in the selected ETF. It aggregates the value traded across all the secondary listings (cross listings) of the share class.
- Brokers will look at an ETF's liquidity across multiple exchanges, the MTF (multi trading facilities), and the underlying bonds' liquidity.
- In this ETF example, over 95% of traded volume (light blue bars) is going through the MTF.

Panel 2

The fund flow

- This shows the fund flow for the ETF share class ([ETF4 LN] in this example), consistent with the NAV <go> Bloomberg function.



European-listed vs. U.S.-listed ETF trading

The European-listed ETF (UCITS) trading landscape has some notable differences relative to U.S.-listed ETFs:

- 1 A **European ETF** might have **various listings** in different currencies and across **multiple exchanges**.
- 2 There are often **multiple share classes** with similar diversified trading footprints that each offer slight variations (e.g. accumulating or currency-hedged). As such, selection of the appropriate ticker listing is key for the right kind of exposure.
- 3 The **lending rules** in the underlying basket of holdings have a slightly different treatment relative to their U.S. counterparts.

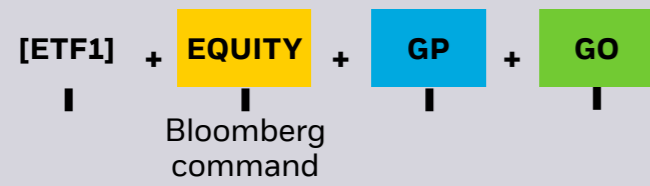
ETF trading strategies

Please see page 28 to learn how to determine the best ETF trading strategy for a variety of objectives.



The graph price (GP) and VAP function

The GP function for plotting various features on ETFs



GP



a The Left click on the 'last px (price)' tabType in new function you wish to explore. Use keywords to initiate graph history

example 1
type 'yield' in highlighted tab and various yield options become available for the user in pop up box
SP 111 = YAS bond yield
SP 112 = YAS spread to benchmark
.... And many other selections

example 2
type 'fund' in highlighted tab and various flow options are shown in the pop up box FD004 = Fund total assets
FD447 = Fund flow..... And many other selections

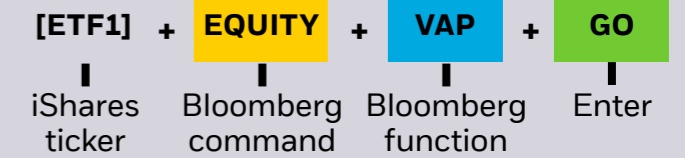
b If a user left clicks the 'last px' tab without suggesting a word function search, a pop up box with a 'find all.....' option appears (not shown). Left click 'find all' and this window appears with further graph suggestions and categorized fields

c Now showing YAS Bond Yield = SP 111 and historic yield graph

For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The volume at price (VAP) function

The VAP Bloomberg function provides a variety of options to explore historic ETF trades at various prices on-exchange.

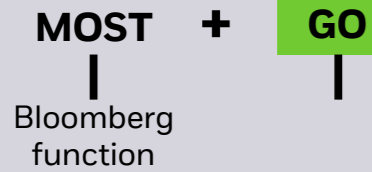


VAP

ETF 1		UP	Actions	Export	Settings	Page 1/4 Price and Volume Dashboard				
12:51	01/17/23		Price Filter		Calculation	Bloomberg	Definition			
22:49	01/17/23		Vol Filter		Amount		@ Part%			
Calculation		VWAP	Volume	Value Traded	Trades	Avg Size	Std Dev			
Bloomberg		99.7990	7,785,451	776.98MLN	16,896	461	0.060080			
Custom		99.7990	7,785,451	776.98MLN	16,896	461	0.060080			
Summary		Top Trades (AQR)		Volume at Price (VAP)		Trade Summary Matrix (TSM)				
Trades with the Largest Impact										
Date	Time	Volume	Price	Exch	Date	Time	Volume	Price	Exch	Spread / Price Ratio
01/17	17:29:14	258,826	99.7900	UD	01/17	20:21:15	29,126	99.8050	UD	.009023
	21:14:38	200,000	99.7400	UD		17:23:20	28,169	99.8000	UD	
	21:00:00	179,024	99.7400	UP		18:15:12	27,091	99.7300	UD	
	17:07:58	121,320	99.8700	UD		16:11:13	24,701	99.8400	UD	
	14:53:37	91,444	99.7500	UD		20:06:50	23,260	99.7800	UD	
	14:30:00	89,466	99.7400	UP		20:34:37	23,126	99.7600	UD	
	16:57:37	72,915	99.8700	UD		17:29:22	21,171	99.7900	UD	
	16:11:13	66,982	99.8300	UD		15:49:23	19,967	99.9100	UD	
	17:07:58	47,405	99.8800	UD		17:20:53	19,978	99.8200	UD	
	14:32:38	38,825	99.6700	UD		19:50:41	19,935	99.8000	UD	
	15:57:30	31,800	99.9050	UD		20:08:05	19,925	99.7700	UD	
	20:33:19	31,757	99.7600	UD		18:39:48	18,983	99.8000	UD	
	20:36:37	29,600	99.7596	UD		20:40:52	18,949	99.7700	UD	
	19:47:58	29,147	99.8000	UD		17:30:15	18,371	99.7807	UD	

For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The MOST function



The MOST Bloomberg function shows a snapshot of intraday turnover across all ETFs. It is a summary screen that shows secondary turnover from all providers.

MOST



- a** Security type ETFs
- b** Select Value tab

Fixed Income ETF trading and liquidity

The growth of fixed income ETF liquidity provides a route for investors to implement sizeable trades anonymously and with minimal market impact. Institutions can use ETFs to quickly manage exposure by cutting, hedging, or rebalancing portfolios efficiently.

\$740.1 bn

Driven by the increased volatility, US listed fixed income ETFs recorded their highest monthly trading volumes on record in March 2020.²¹

16,3%

As of 2023, trading volumes of US listed fixed income ETFs has grown at an annualized rate of 16.3%, surpassing the annualized AUM growth of 13.1%.

Full year secondary trading volumes in the US totaled \$5.8tn, or \$23.4bn/day, in 2023 as March and October 2023 notched the second and third highest monthly trading volumes on record after March 2020.²²

U.S. Fixed Income ETF AUM vs. trading volumes²⁰

Year	AUM (\$BN)	ADV (\$BN)
2019	818	10.9
2020	1.063	16.6
2021	1.240	17.2
2022	1.278	24.6
2023	1.513	23.4
YoY % Change	18.40%	-5.10%
5 year annual growth	13.10%	16.30%

²⁰ Source: BlackRock, Bloomberg as of 29th December 2023

²¹ Source: BlackRock, Bloomberg as of 29th December 2023

²² Source: BlackRock, Bloomberg as of 29th December 2023

The HP function

HP + GO
| Enter

HP

The screenshot shows the Bloomberg terminal interface for an ETF. Callout 'a' points to the 'Fund Flow' column, 'b' to the 'Value Traded' column, 'c' to a specific high value of \$1,944,898,000 on 01/03/23, and 'd' to the 'Average' value of \$864,763,904.

Date	Value Traded	Fund Flow	Date	Value Traded	Fund Flow	Date	Value Traded	Fund Flow
Fr 01/20/23			Fr 12/30/22	822,079,600	97.0043	Fr 12/09/22	890,576,300	98.7089
Th 01/19/23			Th 12/29/22	755,644,900	.00	Th 12/08/22	627,102,100	109.249
We 01/18/23	783,099,800	-161.0918	We 12/28/22	1,180,106,000	329.9057	We 12/07/22	671,616,600	79.6718
Tu 01/17/23	815,870,400	119.6647	Tu 12/27/22	771,607,600	77.7761	Tu 12/06/22	756,368,900	207.4042
Mo 01/16/23			Mo 12/26/22			Mo 12/05/22	795,645,600	157.4445
Fr 01/13/23	672,171,800	169.7197	Fr 12/23/22	472,586,000	166.2649	Fr 12/02/22	629,034,400	29.7432
Th 01/12/23	834,541,900	100.1719	Th 12/22/22	813,131,100	98.1473	Th 12/01/22	1,228,887,000	88.9338
We 01/11/23	606,698,900	-218.7794	We 12/21/22	835,097,200	.00	We 11/30/22	877,053,000	186.3362
Tu 01/10/23	721,085,200	29.6566	Tu 12/20/22	1,008,694,000	127.4727	Tu 11/29/22	648,605,000	253.4389
Mo 01/09/23	779,624,100	158.8373	Mo 12/19/22	1,022,056,000	148.0263	Mo 11/28/22	775,866,900	156.5592
Fr 01/06/23	840,550,100	19.7923	Fr 12/16/22	749,535,400	198.5354	Fr 11/25/22	266,262,000	.00
Th 01/05/23	947,678,200	440.6657	Th 12/15/22	938,318,500	228.8723	Th 11/24/22		
We 01/04/23	988,191,000	744.9193	We 12/14/22	1,057,714,000	129.5648	We 11/23/22	575,890,600	97.8383
Tu 01/03/23	1,944,898,000	.00	Tu 12/13/22	908,713,200	198.7704	Tu 11/22/22	782,905,800	.00
Mo 01/02/23			Mo 12/12/22	1,026,315,000	207.2872	Mo 11/21/22	662,636,500	29.0601

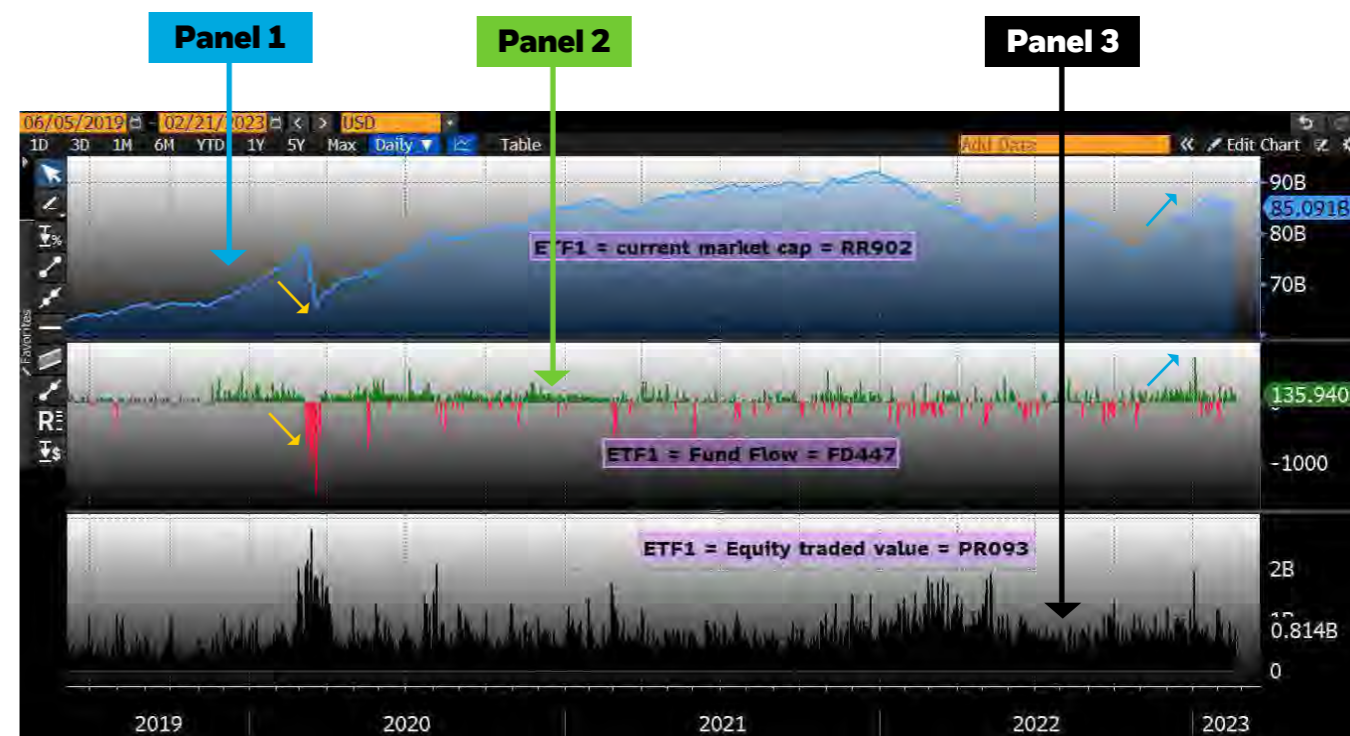
For illustrative purposes only. As at 18th January 2023.

This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a Fund flow** Creations/redemptions expressed in USD millions.
- b Value traded** Expressed in USD value. For this example, secondary trading in ETF 1 often occurs without the need for creations/redemptions. Buyers and sellers simply trade in the marketplace. For this reason, value traded is often much higher than fund flow in seasoned ETFs. All trades are listed on the US exchanges, so this is a real measure of secondary market activity.
- c Noteworthy flows** On 3rd January 2023, high volumes of secondary turnover / value traded took place totaling \$1.945 billion.
- d Average values** Shown in the middle section, this relates to a period of dates chosen (not calendar displayed on page). In the above example, it shows that the average daily value traded on ETF 1 between 18th January 2022 and 18th January 2023 was \$0.864bn.

ETF fund flow and market capitalization

Increased fund inflow (or outflow) has an immediate impact on the market capitalisation of an ETF. This in turn can provide important information on market sentiment for the changes in market exposure in certain asset segments.



For illustrative purposes only. As at 21st February 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Panel 1

ETF market capitalization

ETF market capitalisation - ETF 1 market capitalisation is \$85.091 billion in this illustration.

ETF 1 inflows were evident in Q4 2021, and the market capitalisation of the increased.

The red bars represent daily outflows (redemptions). ETF 1 saw significant outflows between February and March 2020 at the initial onset of the COVID-19 pandemic.

Panel 2

ETF daily flows

The green bars represent daily fund inflows (creations) which are seen to increase at the same time as market capitalisation (panel 1) increases.

Panel 3

Daily value traded

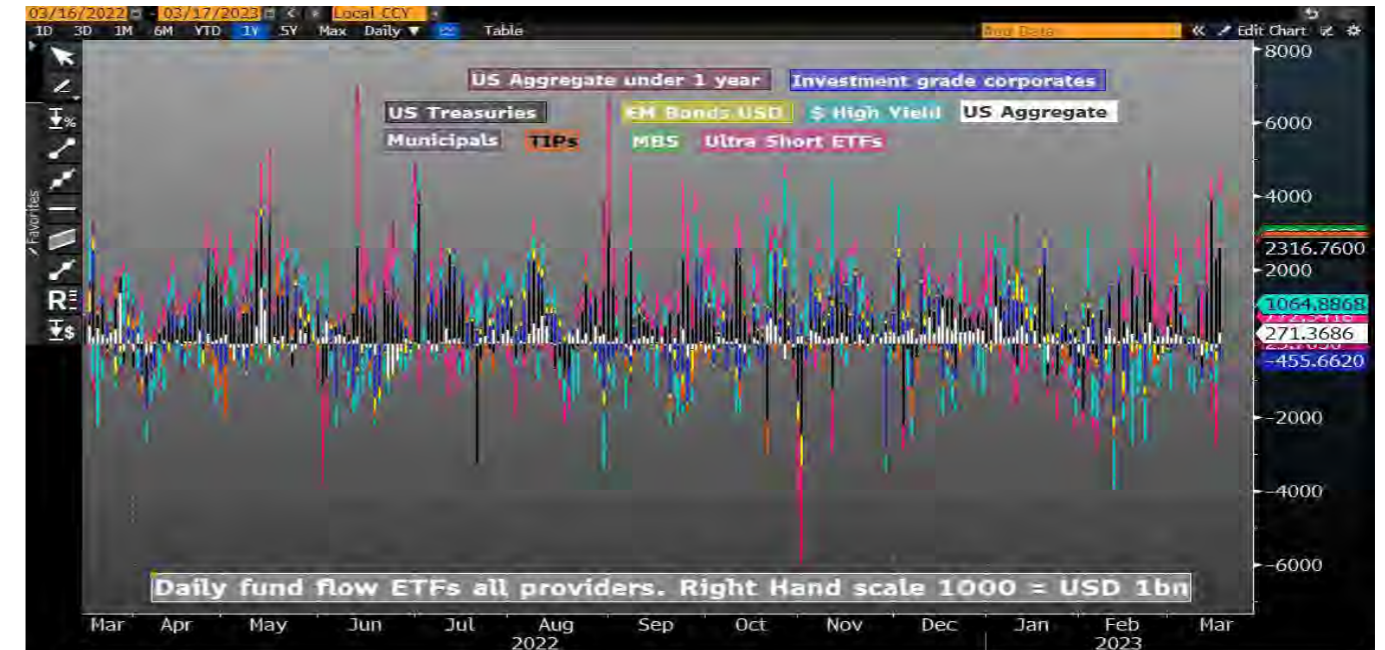
Custom ETF fund flow analytics with the compX international Inc (CIX) and G functions

For a deeper dive on ETF fund flow analytics, investors can use the CIX and G Bloomberg functions. These offer a powerful and straightforward approach to building custom ETF fund flow and value traded graphs, where analyses can be conducted by country or asset class.

The example shown on the opposite page illustrates daily USD bond ETF flows and value traded from all providers, for ETFs with total assets greater than \$1B. An aggregated CIX graph such as this can provide a useful overview of developing market trends by designated fund category.

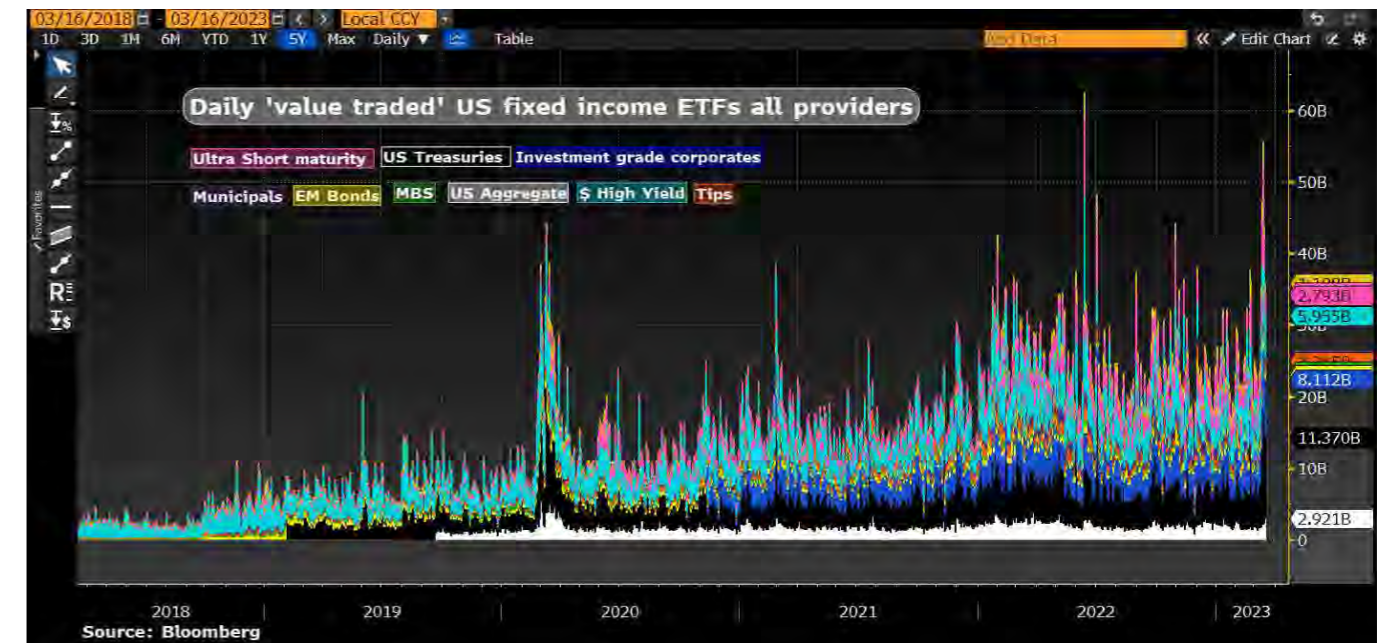
USD bond ETFs fund flow and value traded by category. All providers

Fund flow



For illustrative purposes only. As at 17th March 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Value traded



For illustrative purposes only. As at 17th March 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Total cost of ownership

How to analyze the true cost of owning an ETF

Cost is an important consideration when making any kind of investment. The ETF vehicle has become increasingly popular due to cost-efficiency, but it is important for ETF investors to understand how to assess the total cost of buying, holding, and selling an ETF. This requires investors to look

beyond the headline Total Expense Ratio (TER) and consider the Total Cost of Ownership (TCO). While the TER is the most often quoted ETF expense, TCO analysis looks deeper and provides a more holistic view of portfolio costs.

Key questions to ask

1. What is the TCO of an investment?

2. What are the internal and external factors that contribute to the TCO of an ETF?

3. How to calculate the TCO of an ETF investment?

1

2

3

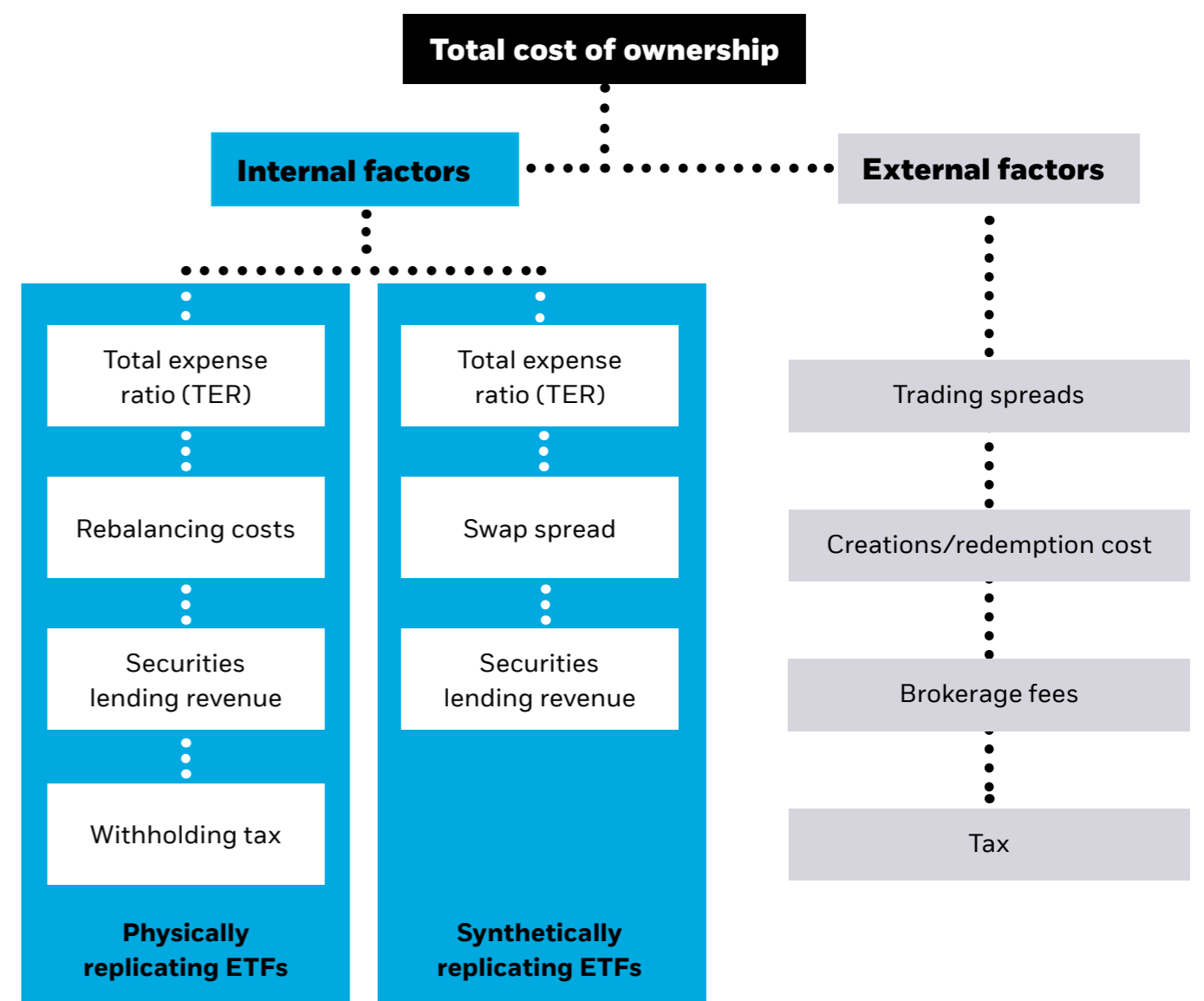
What is TCO?

The headline cost borne by all ETFs is the Total Expense Ratio (TER). This cost covers the annual expenses incurred to run the fund. It is important to highlight that the annual management fee is only one component of the TER. For European-domiciled funds governed by the UCITS rules, the TER of a fund includes the management fee and a list of other costs carried by the asset manager, including administration costs, custody and audit

fees and legal, regulatory and registration expenses. The level of the TER depends on the exposure the fund is providing, the fund structure and the pricing policy of the ETF provider.

It is normally easier to look at the components of an ETF's TCO by separating them into two categories: Internal and external factors.

Internal and external factors



For illustrative purposes only, projected.



Defining internal factors

Internal factors include both costs to the fund and revenues received by the fund: these need to be added together for the same time period. These internal factors have an impact on the tracking difference of an ETF versus the benchmark and normally include: TER, rebalancing costs and any securities lending revenue generated.

There may be additional internal factors, depending on the ETF's portfolio management style and its structure. These factors could potentially include: tracking, the cash component in the fund, and tax. An ETF's portfolio management style, either fully-replicating, stratified, or optimized also influences the tracking of physical ETFs. Funds with liquid, accessible underlying securities are expected to track their benchmarks very closely, whereas funds with less liquid underlying securities will likely have a higher tracking cost.

Another factor which may affect fund performance is the tax liability on dividends (withholding tax). This factor becomes particularly important when the taxation rules of the index are different from the taxation rules of the fund.

For example, some indices are only available as gross total return (implies 0% tax on distributions), while the fund will have to pay withholding tax on the distributions of the securities in the underlying portfolio. There are also often differences in net total return indices and the actual tax suffered by a portfolio depending on the tax treaty between the domiciles of the ETF and the underlying securities.

It is important to contrast rebalancing costs (an internal factor specific to physically replicating ETFs) with swap spread (an expense specific to derivative replicating ETFs). The swap spread is paid by the fund provider to the swap counterparty for the total return swap agreement. The size of

the swap fee depends on the fund exposure, level of over collateralization (for fully funded derivative replicating ETFs) and on the agreement between the swap counterparty and the fund provider.

Sourcing internal factors

While some internal factors are available on some providers' website (i.e. TER, securities lending revenue etc), others might be more difficult to source. To ensure investors understand the impact of all internal factors in the ETF, we recommend evaluating the 12 months tracking difference of the ETF relative to its benchmark.

Defining external factors

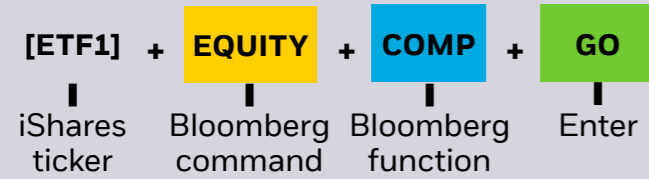
External factors are costs to the investor deducted at the time of purchase and sale of an ETF and include trading or creation/redemption costs along with brokerage fees and taxes.

Trading costs are reflected in the bid/ask spread when buying an ETF in the secondary market (i.e. on-exchange or Over-The-Counter [OTC]). Bid/ask prices reflect the value at which an investor can buy or sell shares of an ETF and are driven by many factors including supply and demand forces, the size of the fund, the liquidity of the underlying securities, and the number of market-makers in the fund.

All tax data is for illustration purposes only and does not represent tax advice. BlackRock does not provide tax advice, the content of the information provided is for information purposes only and is meant to provide investors and intermediaries with an overview as to some of the tax statuses of the iShares funds. This information is not intended to, nor does it, provide specific investment or tax advice, or to make any recommendations about the suitability of iShares for the circumstances of any particular investor. We recommend that clients consult with their own independent tax advisor should they have any further queries about how investing in an iShares fund will affect their tax position.

5.3 COMPARING ETFs

The ability to compare ETFs with other ETFs, indices, or securities can offer valuable investor insights. There are several functions on Bloomberg that allow investors to compare ETF returns, valuations, and other characteristics.



The COMP function

The COMP <go> Bloomberg function enables investors to compare returns of an ETF with indices or other securities.

COMP



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a COMP view** Enter the iShares ticker and chosen index or indices to view a return comparison (default is the underlying index).
- b Graph relative to security setting** Adjust the graph to view index and ETF absolute performance (unticked) or relative performance (ticked). The latter is useful for exploring tracking error of the ETF to its underlying index.
- c ETF total return setting** "NAV" setting can ensure no jumps in closing price levels to NAV, as the price of the ETF can vary in premium/discount to NAV. "Price" setting displays the total return of the ETF based on closing prices, regardless of the premium/discount to NAV.
- d HFA view** Enter the iShares ticker and HFA for one fund view versus underlying benchmark. Uses price return. (not illustrated)

Using the COMP function to compare ETF price and NAV returns

In theory, an ETF that fully replicates its index should underperform the index by its expense ratio. However, ETFs can often outperform or underperform their underlying indices for various reasons.

Some ETF providers engage in securities lending of the underlying portfolio, which can generate additional revenue, leading to outperformance of the fund. In addition, some ETFs are optimized to match the characteristics of the index they track – instead of fully replicating it – which can result in deviations from index performance.

In this example, [ETF1] underperformed its underlying index very slightly by measure of its NAV and price return. But over the chosen 5 year period the price return was slightly better than the NAV return. This can be attributed to the ETF PRICE trading at a higher premium to its NAV at the end of the chosen period relative to the start.

NAV return



For illustrative purposes only. As at 13th December 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Price return

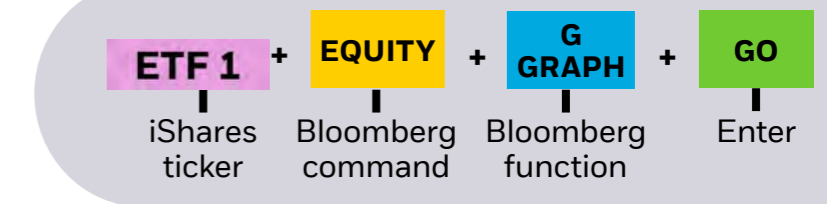


For illustrative purposes only. As at 13th December 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The G Graph and total return analysis (TRA) function

Bloomberg offers a variety of functions specifically designed for bond ETF analytics. The G Graph and TRA Bloomberg functions allow ETF investors to compare total returns.

The G Graph function



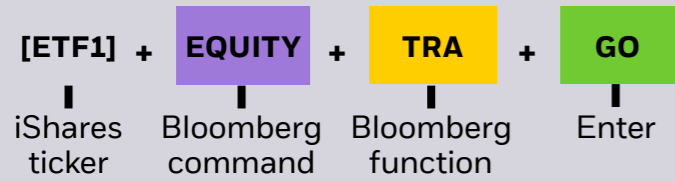
G Graph

The G Graph function and settings show the returns of the ETF using both price and NAV-based methodologies. These numbers are consistent with those displayed on the compare (COMP) page.



For illustrative purposes only. As at 13th May 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The TRA function



TRA

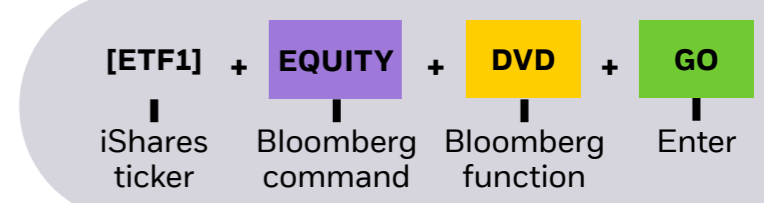


For illustrative purposes only. As at 13th May 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a Settings** ETF returns are set to NAV in this example.
- b Total returns** The ETF total return based on a monthly distribution schedule. This figure is consistent with the COMP page.
- c Distributions** Distributions are denoted by a D. In the U.S. markets, ETFs generally have monthly distributions, while semi-annual distributions are more common in Europe.

5.4 BOND ETF ANALYTICS

The DVD function



Dividends, stock splits (DVD)



For illustrative purposes only. As at 13th January 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Distributions (dividends) and treatment of ex-dividend dates

The DVD <go> Bloomberg function shows distribution dates and amounts. In the case of bond ETFs, the ETF accrues interest on a daily basis from the bonds it holds. For all distributing ETFs, there is a record date shown. Any investor that is long on an ETF and is settled by the record date is entitled to receive the income earned by the fund since the prior distribution was made.

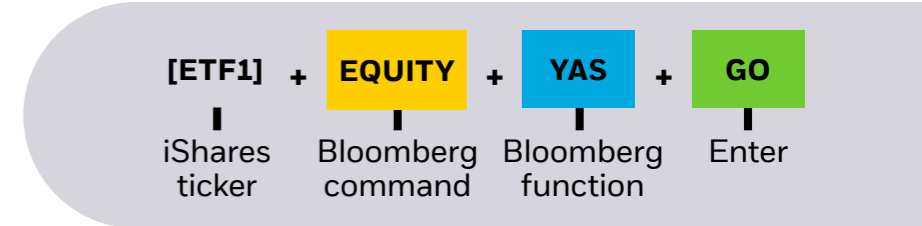
When an ETF distributes interest, each share receives the same amount of income. The fund's NAV decreases by the amount of the distribution.

The ETF will trade 'ex - dividend' before the distribution is paid, (shown on the 'payable' column). Buying an ETF on or after the ex - dividend date does not confer rights to the distribution.

The fund may make distributions from capital as well as income or pursue certain investment strategies in order to generate income. Whilst this might allow more income to be distributed, it may also have the effect of reducing capital and the potential for long-term capital growth.

The YAS function

The Yield and Spread Analysis (YAS) tool enables users to analyze yield spread and interest rate sensitivity. Originally developed for individual bonds, YAS has been enhanced for analyzing select iShares ETFs.



YAS

ETF 1		ACF Modeled ETFs		Settings		Yield and Spread Analysis	
97.570/97.570				@ 01:04		Notes Buy Sell	
ETF 1 description		Risk		Duration		6.428	
Spread	86.340 bp vs 7yT 3 05/31/30	Modified Duration		Convexity		6.279	
Price	97.57	DV		01 on 102,491 Shares		6.279	
Yield	4.733 Wst 3,869480 5/A	PV		0.01		0.06126	
Model	BAM	Yields, Spreads & Risk metrics based on ACF Calc					
Settle	06/01/23 05/31/23	Spread		Yield Calculations			
		1) G-Sprd		Street Convention		4.733	
		2) I-Sprd		Equiv 1 /Yr		4.789	
		Net Ind Yld		3.066		Invoice	
						Shares 102,491	
						Total (USD) 10,000,046.84	
Security Info		18 CSHF					
Holdings in Portfolio (05/24/23)		10943					
Portfolio Value (MM) (05/24/23)		89,969					
Avg Bond Price of Portfolio (05/24/23)		N.A.					
Weighted Avg Mty (06/29/32)		9.10 yrs					

For illustrative purposes only. As at 27th May 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

YAS



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Modifying YAS for targeted analysis

The YAS function displays the ETF's last-traded price with corresponding yield, spread, and risk characteristics.

Several fields can be modified for further analysis:

- Maturity year, ticker, and coupon of the benchmark bond using the vs. field.
- Curve from which the benchmark bond is selected using the G-Sprd field.
- Swap curve from which the benchmark is selected using the I-Sprd field.
- CDS spread using the Basis field.

With the YAS function, Bloomberg users can now:

- Analyze a bond ETF the same way single bond instruments are analyzed.
- View a last-traded ETF price, converted to yield.
- Perform traditional yield analysis vs. a selected benchmark.
- Input custom parameters to analyze the relationship between price, yield, and spread.
- Measure risk based on custom inputs, to determine whether an ETF meets pre-determined investment criteria.
- Click the red text to view an explanation of the YAS calculation methodology using ACF (Aggregate Cash Flow).

Comparing yields: An ETF vs. its underlying index

When comparing a bond ETF's yield with that of its underlying index, investors might note these two values are different. This is primarily not attributable to differences in the ETF's composition relative to its index, but rather differing yield calculation methodologies.

Index yields are generally calculated using the weighted average of its constituents' yields, while ETF yields are calculated using internal rate of return (IRR) of cash flows.

As such, the shape of the yield curve dictates whether the ETF or its index yield is higher. If the yield curve is upward sloping, the IRR will be higher. If the curve is inverted, it will be lower. In the event of a flat yield curve, the ETF and index yields will be identical.



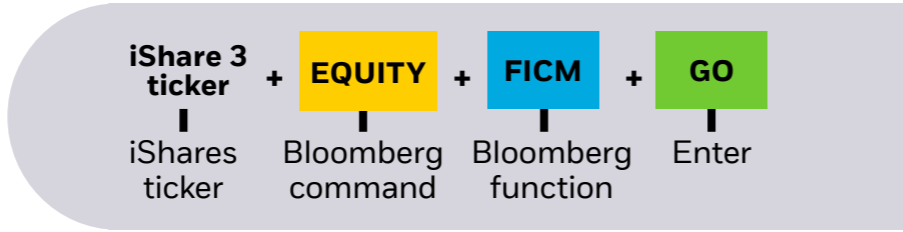
For illustrative purposes only. As at 13th May 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.



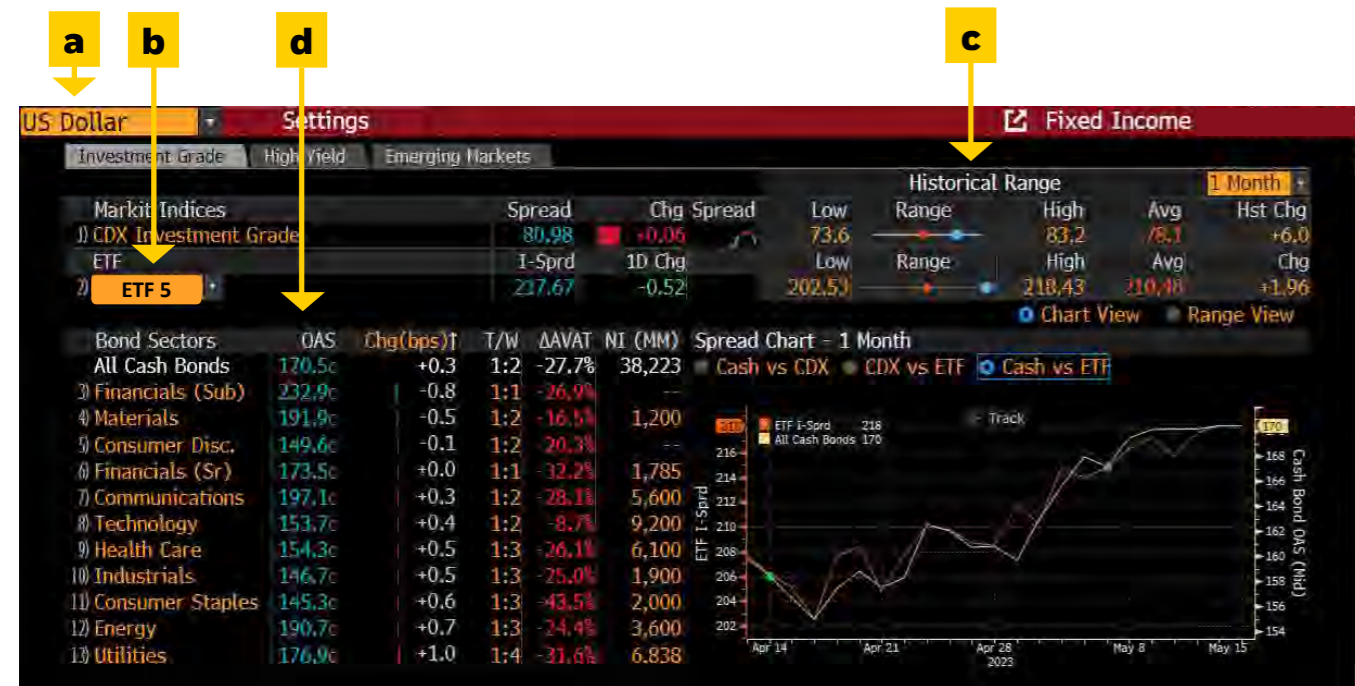
For illustrative purposes only. As at 13th May 2023. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The FICM function

The FICM Bloomberg function allows investors to examine flagship ETFs intraday relative to underlying cash bond and sector components.



FICM



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a Select currency** ETF currency is set to USD in this example.
- b Select ETF** [ETF5] is selected in this example.
- c Select historical range** A 1-month history is displayed in this example.
- d OAS** This is the market weighted OAS of each bond in the FICM "liquid index". This index is tailored to a subset of liquid bonds that Bloomberg prices every 15 minutes. This new price for each bond, updated every 15 minutes, is used to calculate a sector market weighted OAS and then grossed to the "All bonds" OAS. The constituents are rebalanced monthly.

Comparing ETFs, credit default swaps (CDS), Total Return Swaps (TRS), and underlying indices

ETFs, credit default swaps (CDS), and Total Return Swaps (TRS) are all key tools when managing a fixed income portfolio. There are some important underlying differences between the three instruments, and different levels of adoption amongst sovereign portfolios. Bloomberg allows for analysis and correlation studies across all of these vehicles.

CDS typically have a narrower issuer inclusion in their index than credit ETFs, which has implications for tracking broader credit indices.

Some asset owners are unable to short securities. If they are unable to short credit ETFs, they might use derivatives and buy CDS protection to protect a portfolio from spread widening.

MEMC for CDS composition



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a Enter CDS** CDX IG CDSI GEN 5Y corp <go> (Markit CDX North America Investment Grade Index)
- b View underlying names** This CDS example has 125 names, equally weighted (partial page shown).
- c Last trade spread** In this example, it shows a composite price based on quotes.

PORT for ETF composition



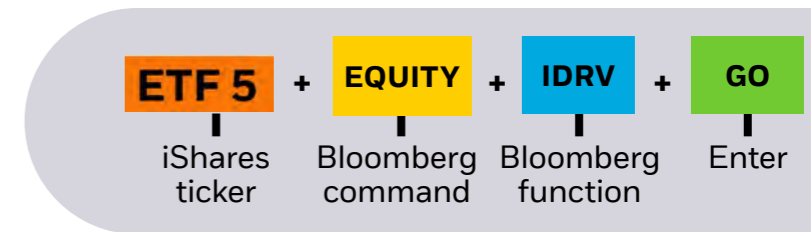
For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a Enter ETF** 'iShares ticker' equity PORT.
- b View underlying issuers** This ETF example has 1,600 issuers (partial page shown) and 9.684 fund holdings (not shown).
- c Parent issuer name custom view** See pages 102-103.

Data as of 13th May 2023.

The IDRV function

The IDRV <go> Bloomberg function allows investors to examine current and historic correlations and spreads to CDS and indices.



IDRV



For illustrative purposes only.

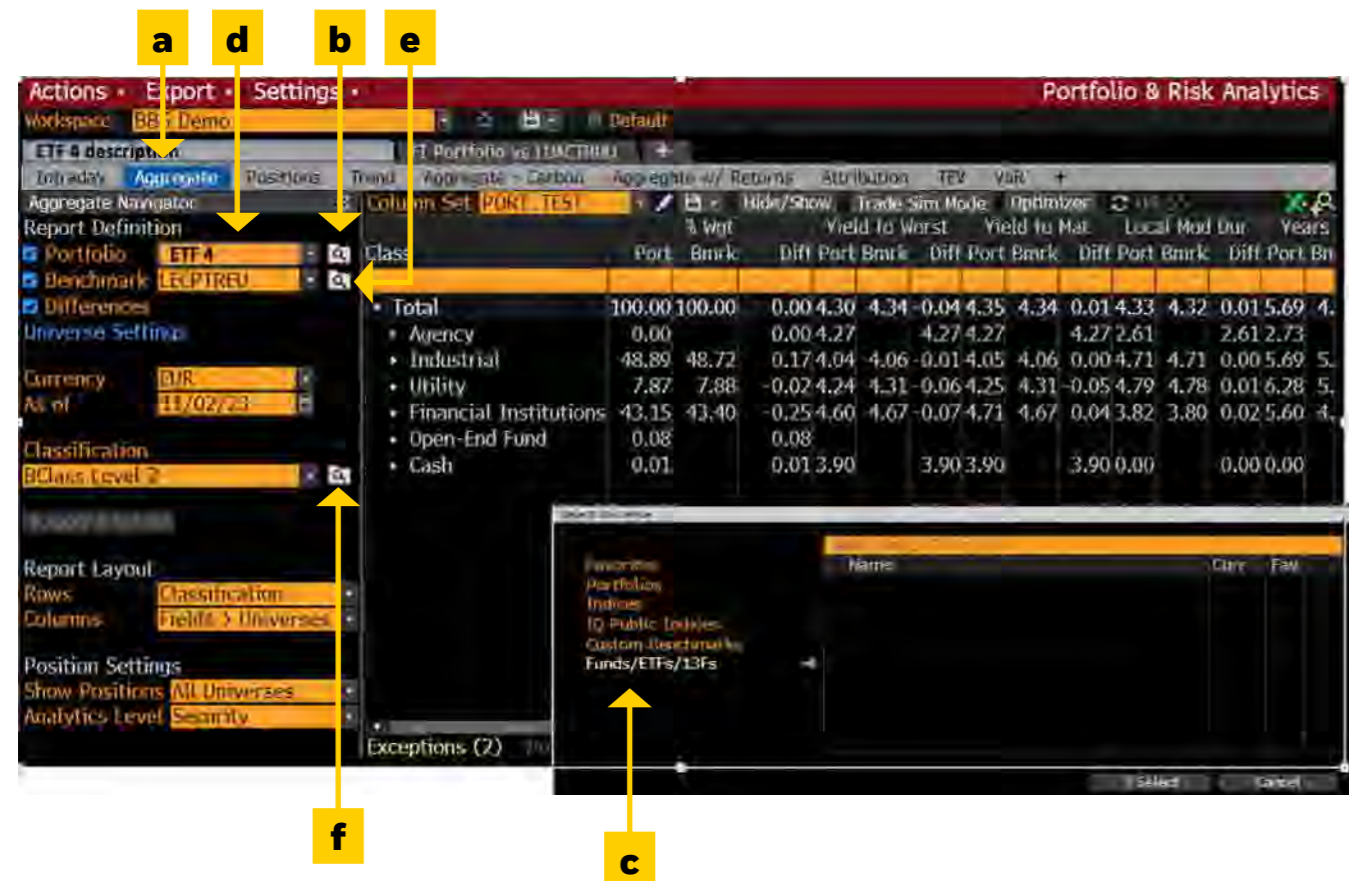
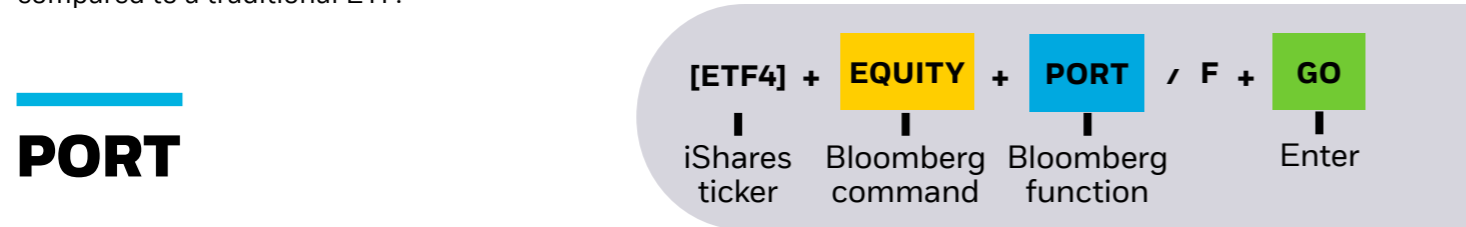
- a ETF/Index/CDX inputs** Once an ETF is entered, Bloomberg will select the underlying CDS or Bloomberg associated index (not necessarily the index the selected ETF tracks). Likewise, if the user has entered a CDS or Bloomberg Index, associated ETFs will populate.
- b Adjust for risk** This field allows for views of the Bloomberg credit spread duration evaluations (currently not selected). For example, ETF 5 might not have the same duration as the CDS shown.
- c HS graph** Clicking on this will display analytics between two selected indices (ETF vs. CDS shown). Eventually, the CDS and ETF chosen move at different magnitudes because of index components and credit duration measures.

5.5 CUSTOM ANALYTICS

Bloomberg offers several functions that give users the ability to customize ETF analytics.

Custom filters with PORT

Investors can create their own custom filters when using the PORT <go> function. The following is an example of a self-created search that shows names excluded from an ETF with an ESG screen, as compared to a traditional ETF.

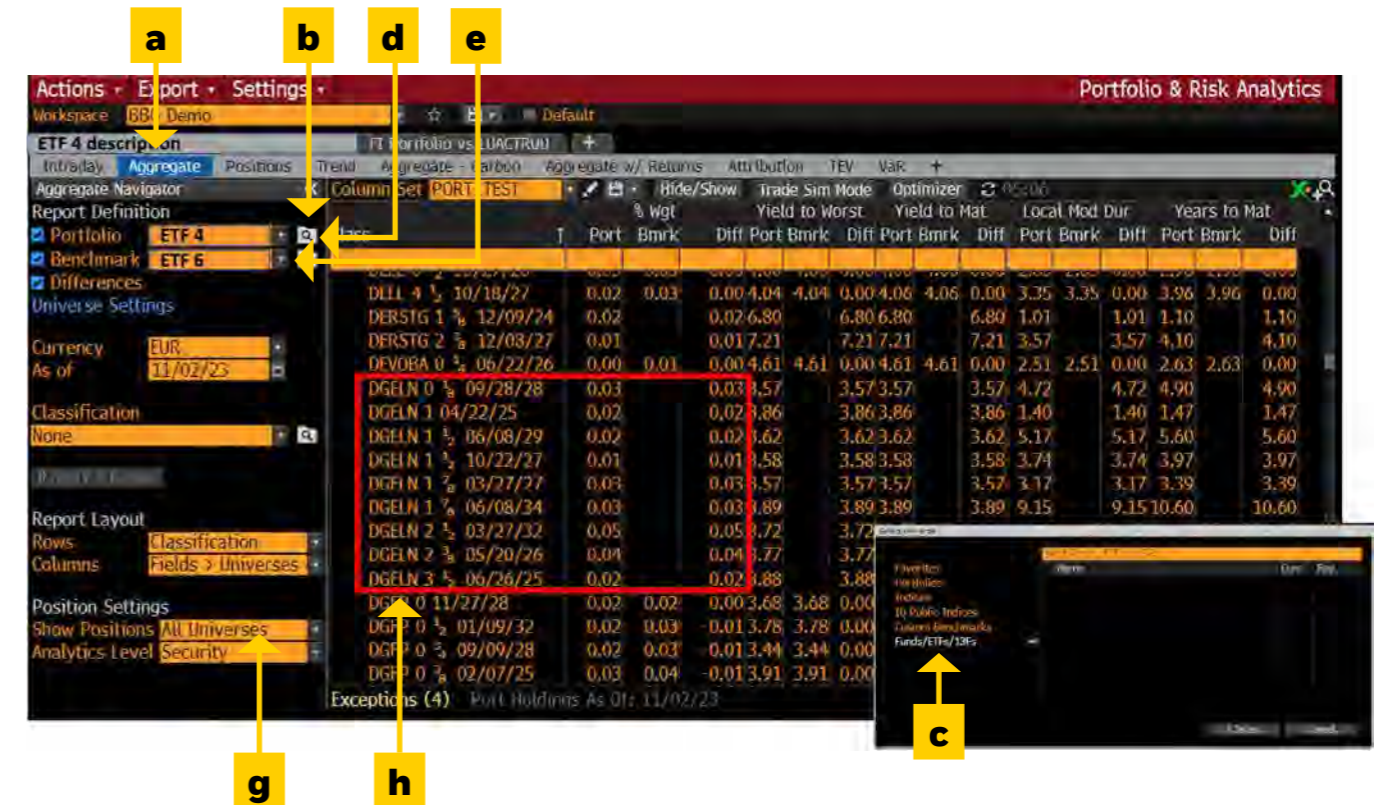


For illustrative purposes only.

- a** Select Aggregate tab.
- b** Left click on “portfolio” arrow tab > “browse all” >.
- c** Floating window appears. Left click “Funds/ETFs/13Fs”.
- d** Type “ETF 4” into “Add Fund, ETF or 13F tab” > Press return, this loads “ETF 4” into portfolio.
- e** Bloomberg will default to underlying benchmark if available as in this example. If another ETF or benchmark needed repeat “b”, “c” + “d” for “benchmark tab” to allow comparison of ETF 4 to another benchmark or ETF.
- f** For sector view chose BClass level 2. Other views available. Or can be left “none”.

Using the PORT function to compare ESG-screened funds to their parent funds

In this example, an investor holds an EUR iShares corporate bond and is looking to switch into a EUR iShares ESG corporate bond.



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** Select Aggregate tab
- b** Left click on “portfolio” arrow tab > “browse all” >
- c** Floating window appears. Left click “Funds/ETFs/13Fs”.
- d** Type “ETF 4” into “Add Fund, ETF or 13F tab” > Press return, this loads “ETF 4” into portfolio.
- e** BENCHMARK TAB. Rather than the underlying benchmark we want to compare to “ETF 6”. Repeat “b”, “c” + “d” for “benchmark tab” to allow comparison to ETF 4.
- f** For sector view chose “none”.
- g** Show “positions” = all universes for security view.
- h** The table above shows a section of the portfolios for comparison at security level. Portfolio “ETF 4” = non ESG fund. Benchmark “ETF 6” = ESG Fund. With selected securities shown, it is clear DGELN is excluded from the “% weighting benchmark column”. An expanded example for these ETFs would show the “ETF 6 ~ ESG” fund for example would hold 30% less bonds than the “ETF 4” fund.

The outcome

The investor consulted BlackRock to inquire about where the ETF portfolio managers saw the overlap between the funds, and what the estimated switch terms were between the two ETFs. The investor does not trade directly with BlackRock as an index manager, but with this information was able to present a two security switch to the investment banks at very efficient pricing based around the NAV of the funds.

The UNCL function

UNCL + **GO**
 | |
 Bloomberg + Enter
 function

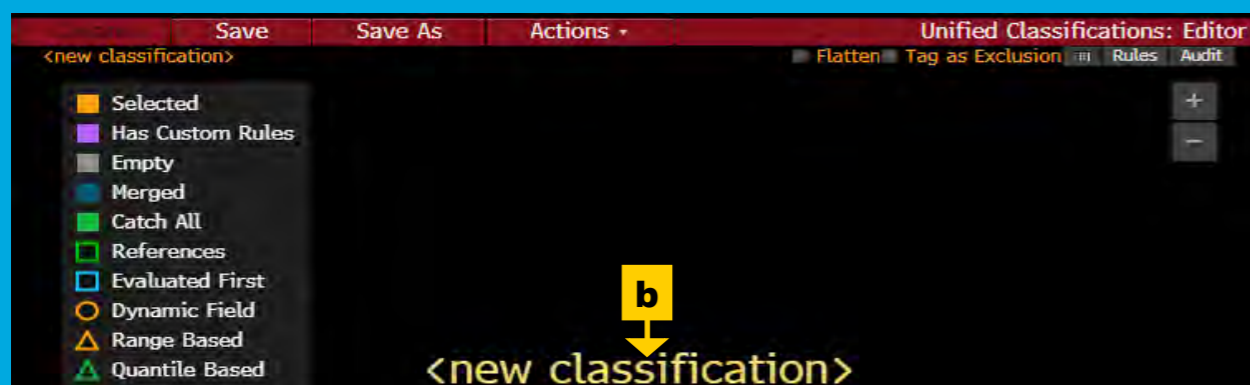
Investors can create their own custom filters when using the UNCL <go> function, identifying different issuers on a parent name level as opposed to an underlying securities level. As the following example illustrates, the UNCL function can be useful for bespoke filters.

UNCL

The UNCL <go> Bloomberg function allows for custom creation searches.

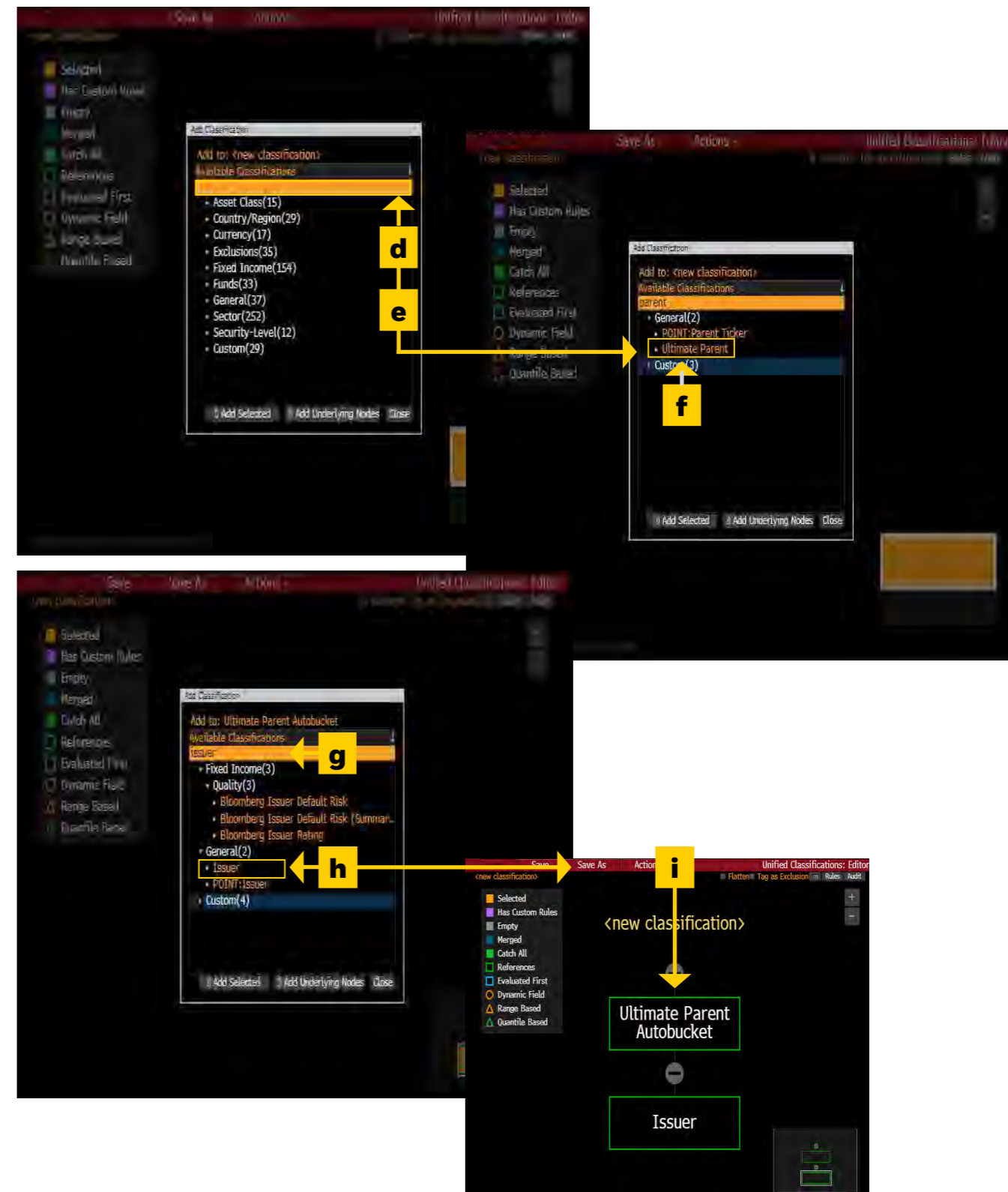


For illustrative purposes only.



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** Left click on **“Create”**
- b** Right click **“New Classification”**
- c** When pop-up box appears, left click **“Add Classification” (no screenshot)**



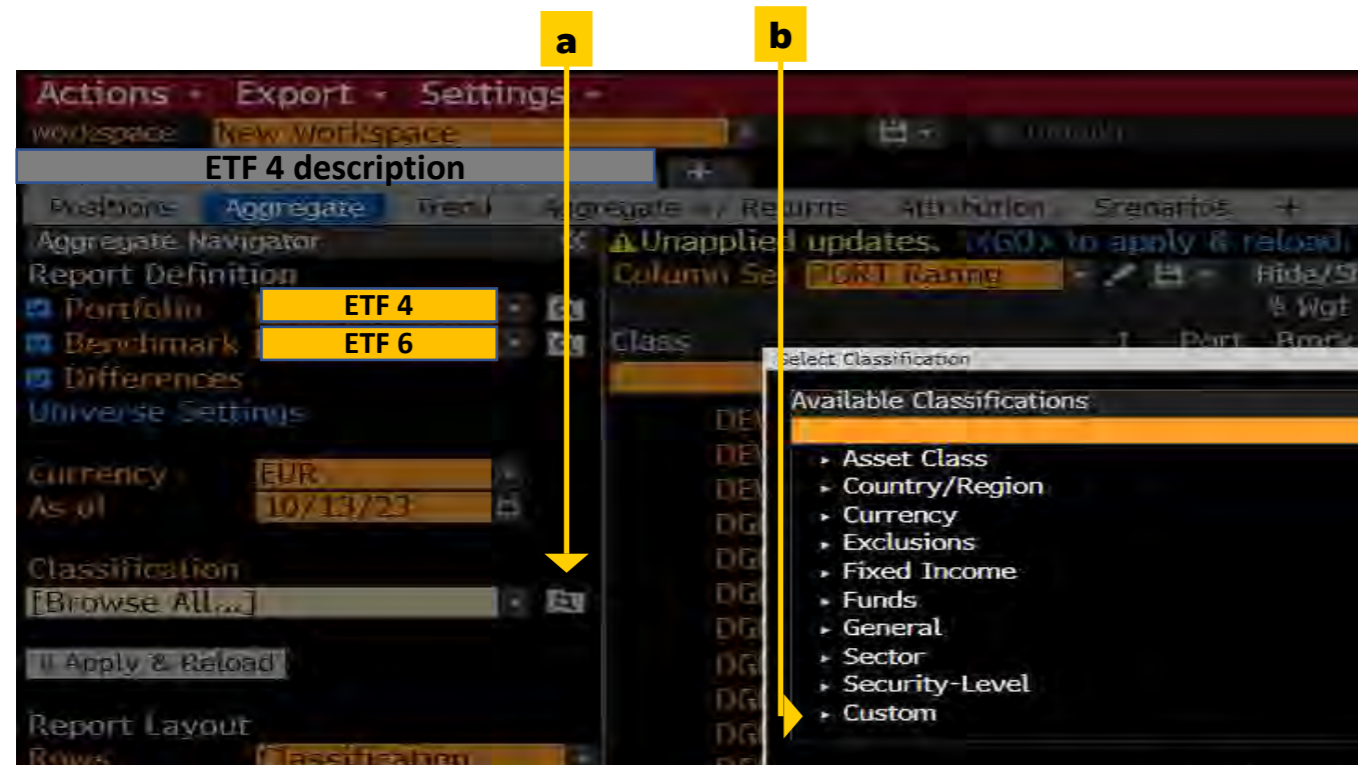
For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- d** Type **“Parent”** (or desired search word) in orange box
- e** Select **“Ultimate Parent”**
- f** Right click on **“Ultimate Parent”** and select **“Add Classification”**
- g** Type **“Issuer”** in the yellow tab and select **“Issuer”**
- h** Left click **“Save As”** to save search
- j** Enter desired name for custom search

The ultimate parent analytic

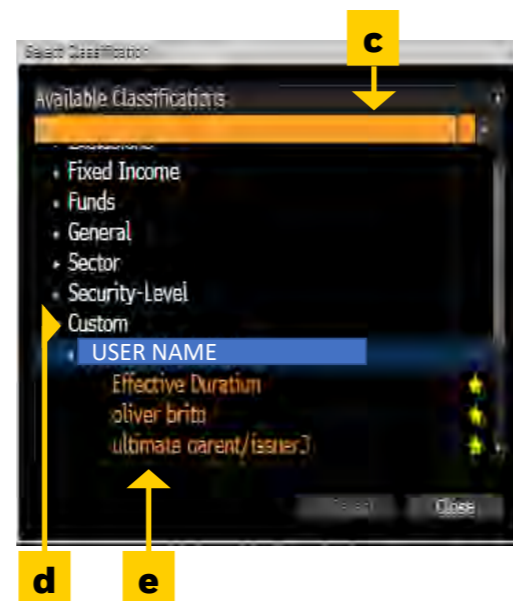
As reviewed on the previous pages, the PORT <go> and adapted UNCL <go> functions can be useful for identifying different issuers from the parent name. The below example illustrates how to select **Ultimate Parent** search criteria. Using the template PORT search we used on page 102:

PORT



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** Classification. Left click arrow to 'browse all' drop down. Press return.
- b** Left click **"Custom"**.
- c** Left click on desired search criteria = **"ultimate parent"**.
- d** Left click **"Custom"**.
- e** Left click on desired search criteria = **"ultimate parent"**.



Once **Ultimate Parent** is selected as search criteria, investors can compare portfolios. The following is an overview of this functionality, using the previous example of an iShares ETF and its ESG-screened counterpart.

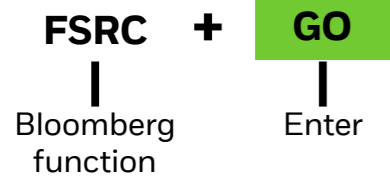
PORT



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

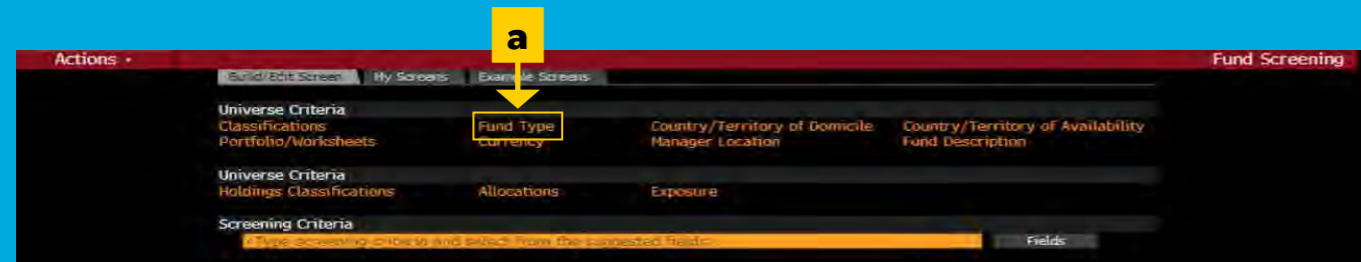
- a** **Classification.** = 'ultimate parent'
- b** The table shows a section of the ETFs' portfolios at the issuer level. Volkswagen AG has a 2.06% weighting in ETF 4, but no weighting in ETF 6 = the ESG screened fund.

The FSRC function



The FSRC <go> Bloomberg function gives users the ability to screen funds using custom criteria. In this example we search for 'currency-hedged ETFs'.

Fund screening (FSRC)

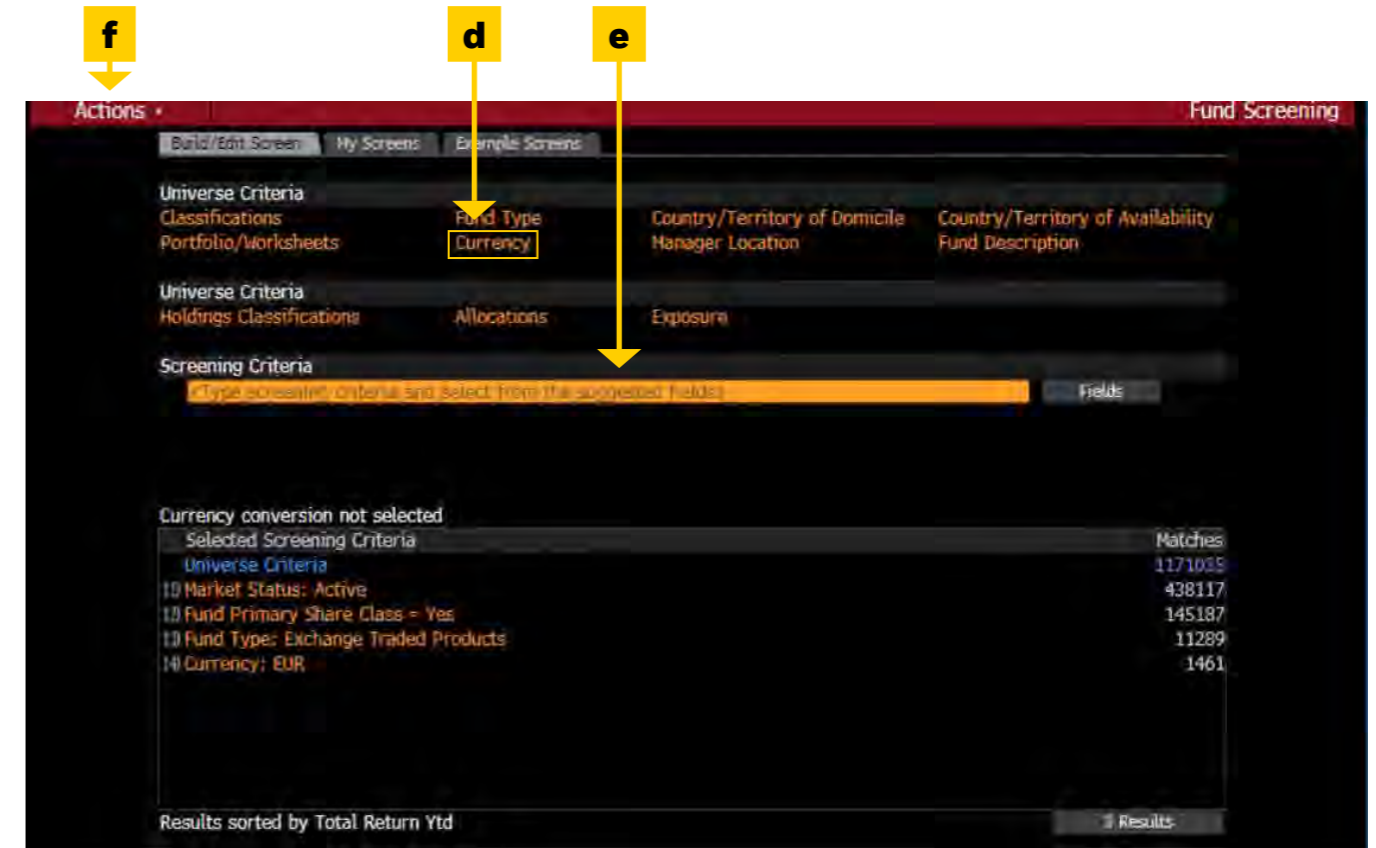


For illustrative purposes only.



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** Left click on **“Fund Type”**
- b** Left click **“Exchange Traded Products”**
- c** Click **“Update”**



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.



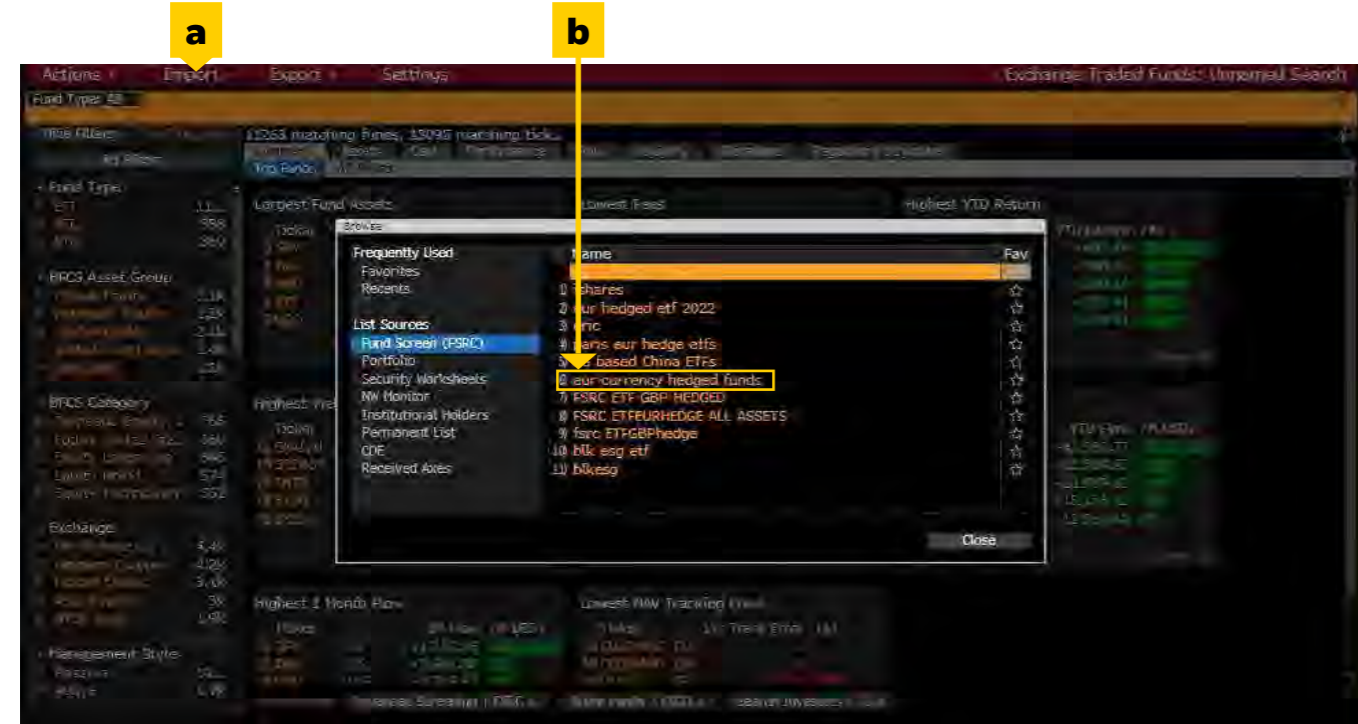
For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- d** Left click 'currency' and choose from pop up box (not shown) which currency is your chosen hedged base. In this example EUR is chosen.
- e** Type 'currency hedged indicator' into blank orange bar. Left click arrow on 'no condition, display only.' Then click 'equal to' > 'yes' > 'results'
- f** Click **“Actions”** to save and give shortcut name.
- g** Click **“My Screens”** tab to view saved custom searches. This shortcut name can be used in the ETF <go> search bar.

The ETF function for fund search

The ETF <go> function can be used for customized fund searches

ETF



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.



The illustration has names of funds hidden in this publication.

- a** Left click "Import" tab
- b** When window appears, left click "Fund Screen (FSRC)" (not shown), then left click on desired search
- c** The ETF search function now only shows GBP currency-hedged funds (list shown is truncated and only displays iShares ETFs)



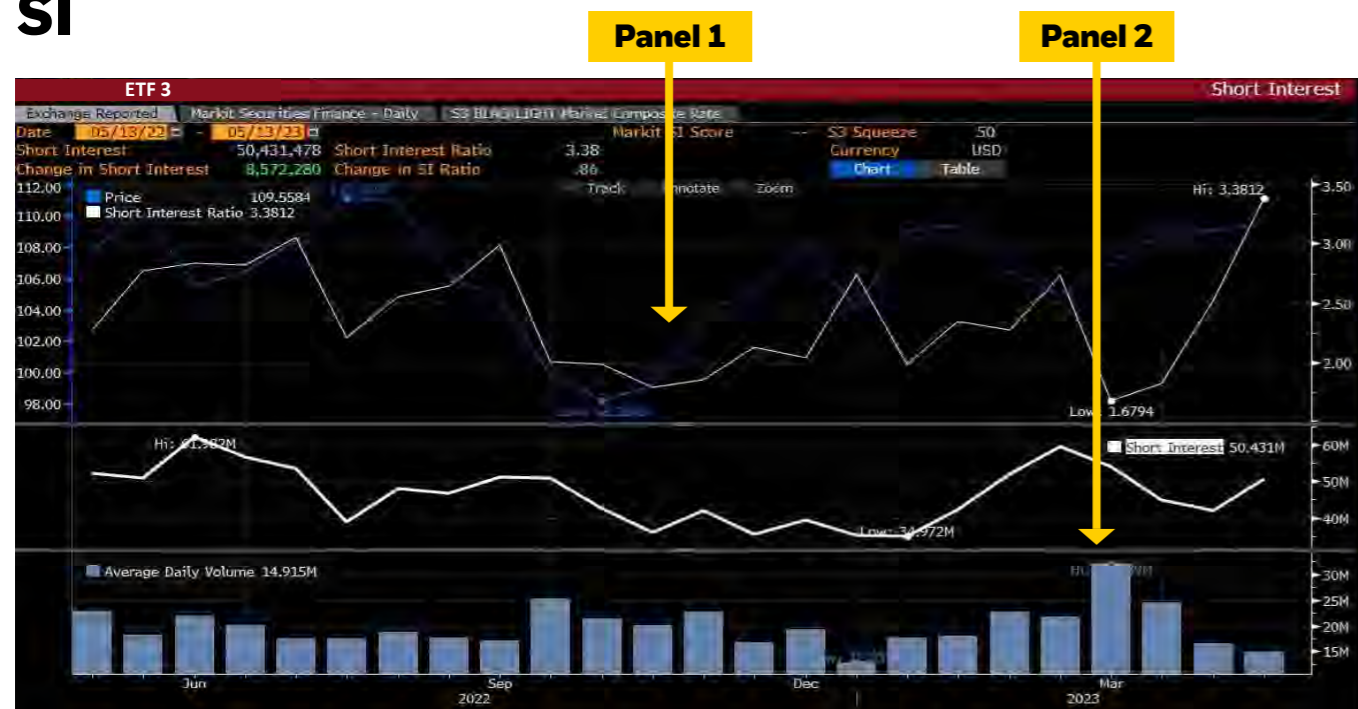
ETF short interest

The SI function



The SI function provides a look into an ETF's level of short interest in a U.S.-listed ETF.

SI



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

Panel 1

Price and short interest ratio

- Short interest ratio (white line) is defined as the number of days it would take to short positions to be covered using the average daily volume of the previous weeks.
- As shown in the example, the [ETF3] has a short interest ratio of 3.3812 days.

Panel 2

Short interest measured in number of shares

- The short interest for [ETF3] is 50.431m shares as of 13th May 2023. Meanwhile the number of shares outstanding during this time was 318.1m. This can be confirmed on any DES page of an ETF.
- The short interest can be calculated as $50.431 \text{ m} / 318.1 \text{ m} = 15.85\%$ shares are shorted.

Short interest and ETF securities lending

If there is a high short interest outstanding, there will invariably be attractive lending opportunities for the ETF owner. Lending out ETF securities can be done directly in the marketplace, and the lending revenues can effectively reduce the ETF cost of ownership. The picture below shows that, over time, a High Yield's ETF short interest (SI) can reach a much higher percentage of its shares outstanding than an Investment Grade Corporate ETF in this example, and also tends to exhibit a higher short interest ratio over time.



Settings For Chart

Pan.	Axis	Security	Data Series	Multi	Spread	Security	Data Series	Multi
1	R1	HY ETF ticker	Shrt Int	1	/	HY ETF ticker	Curr Shares Out	1000
1	R1	EM bond ETF ticker	Shrt Int	1	/	EM bond ETF ticker	Curr Shares Out	1000
1	R1	IG bond ETF ticker	Shrt Int	1	/	IG bond ETF ticker	Curr Shares Out	1000
1	R1	Short IG bond ETF ticker	Shrt Int	1	/	Short IG bond ETF ticker	Curr Shares Out	1000
1	R1	Long Bond ETF ticker	Shrt Int	1	/	Long Bond ETF ticker	Curr Shares Out	1000

For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The W and GS functions for creating ETF yield curves



Investors can use the W <go> and GS <go> Bloomberg functions to create credit yield curves.

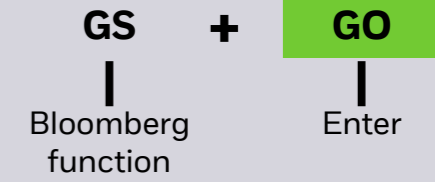
W <go>

Ticker	Last Price	Net	YTD
IG Short	50.5800	-0.12	-0.24%
IG Broad	50.2400	-0.46	-0.51%
IG 5-10 yr	51.0300	-0.24	-0.47%
IG 10yr +	51.3900	0.40	-0.77%
US Agency MBS	94.5000	-0.67	-0.70%
IG Broad	106.3200	-0.67	-0.61%
USD EM Bond	85.2100	-0.54	-0.61%
Municipals	109.8000	0.46	0.43%
US High Yield	74.4200	-0.27	-0.36%
Short High Yield	41.0700	-0.12	-0.29%
US Aggregate	99.3900	-0.56	-0.56%
IG Short	48.5300	0.09	0.19%
IS Short ESG	24.1200	-0.07	-0.28%
IG ESG	22.3400	-0.10	-0.44%
IG ESG 0-3yr	4.9967	--	-0.04%
Fallen Angel	24.7600	-0.13	-0.52%

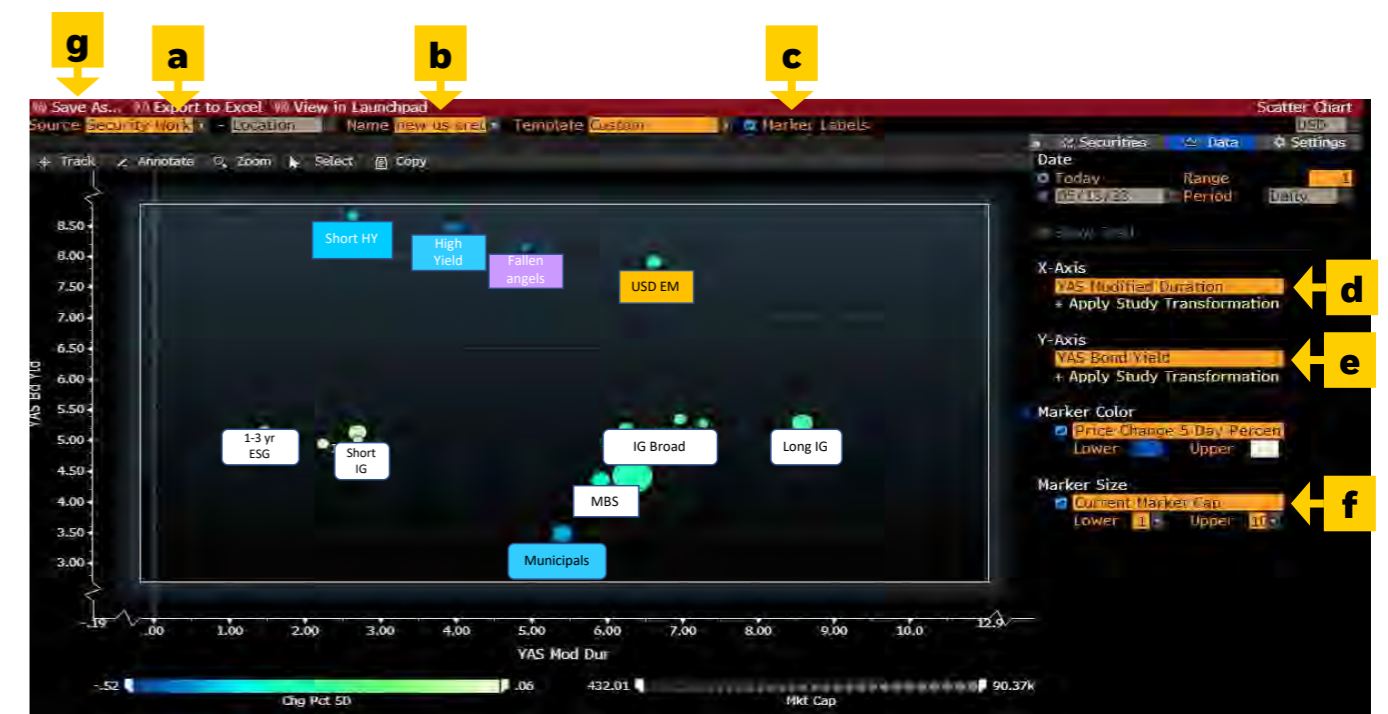
For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** Left click on **“Create New Worksheet”**
- b** Select **“Basic”**
- c** Select **“Create”**
- d** Populate orange tab(s) with desired ETF tickers

The GS function



GS <go>



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

- a** **Source** Security worksheets
- b** **Name** iShares fixed income largest market cap
- c** **Highlight data tab**
- d** **X-Axis** YAS modified duration
- e** **Y-Axis** YAS bond yield
- f** **Market size** Current market cap
- g** **Save graph to become part of G menu**



APPENDIX

All examples and case studies in the appendix are for illustrative purposes only. They are not an offer or solicitation to engage in investment activity and should not be taken as investment advice.

Case studies are for illustrative purposes only; they are not meant as a guarantee of any future results or experience, and should not be interpreted as advice or a recommendation.

Capital at risk. You may get back less than you invested.

6

6.1 ETFS IN HIGH VELOCITY MARKETS: MARCH 2020 CASE STUDIES

Global market volatility reached historic levels in March 2020 amidst the COVID-19 pandemic. In response, investors turned to the most liquid bond ETFs to help navigate bond market dislocations.

ETFs became the real-time price discovery vehicle for markets at a time when transparent quotations and trading activity in underlying securities deteriorated. It became much more efficient to trade in the ETFs themselves, as market participants adjusted positions and managed risk.

ETF market price vs. NAV

The difference between an ETF's market price and net asset value (NAV) is key to understanding ETF price discovery during volatile times.

A bond ETF's NAV is an official measure of ETF valuation, calculated using bid-level index prices (with a few exceptions) at the end of each day. As such, it is an aggregate of individual bond prices—some of which trade infrequently.

An ETF's market price represents an actionable trade price for that fund at the time the price is quoted. Since ETFs trade intraday on-exchanges, their market prices reflect real-time market information.

An ETF's market price and NAV can differ materially, particularly during times of market stress when the ETF's market price reflects rapidly changing real-time information—a process known as “price discovery.” The index price of the underlying benchmark for UCITS bond ETFs is typically calculated at 16.15 GMT for EUR and GBP underlying exposures. NAV uses the same values, but is usually calculated, at a later point in time. For UCITS and 40act ETFs, the underlying benchmark is calculated at 15.00 EST for USD bonds. Some closing price discrepancies between a U.S. domiciled ETF with a USD benchmark and its NAV can occur due to ETFs trading on equity exchanges, where prices close at 16.00 EST.

How do ETF premiums/ discounts to NAV resolve?

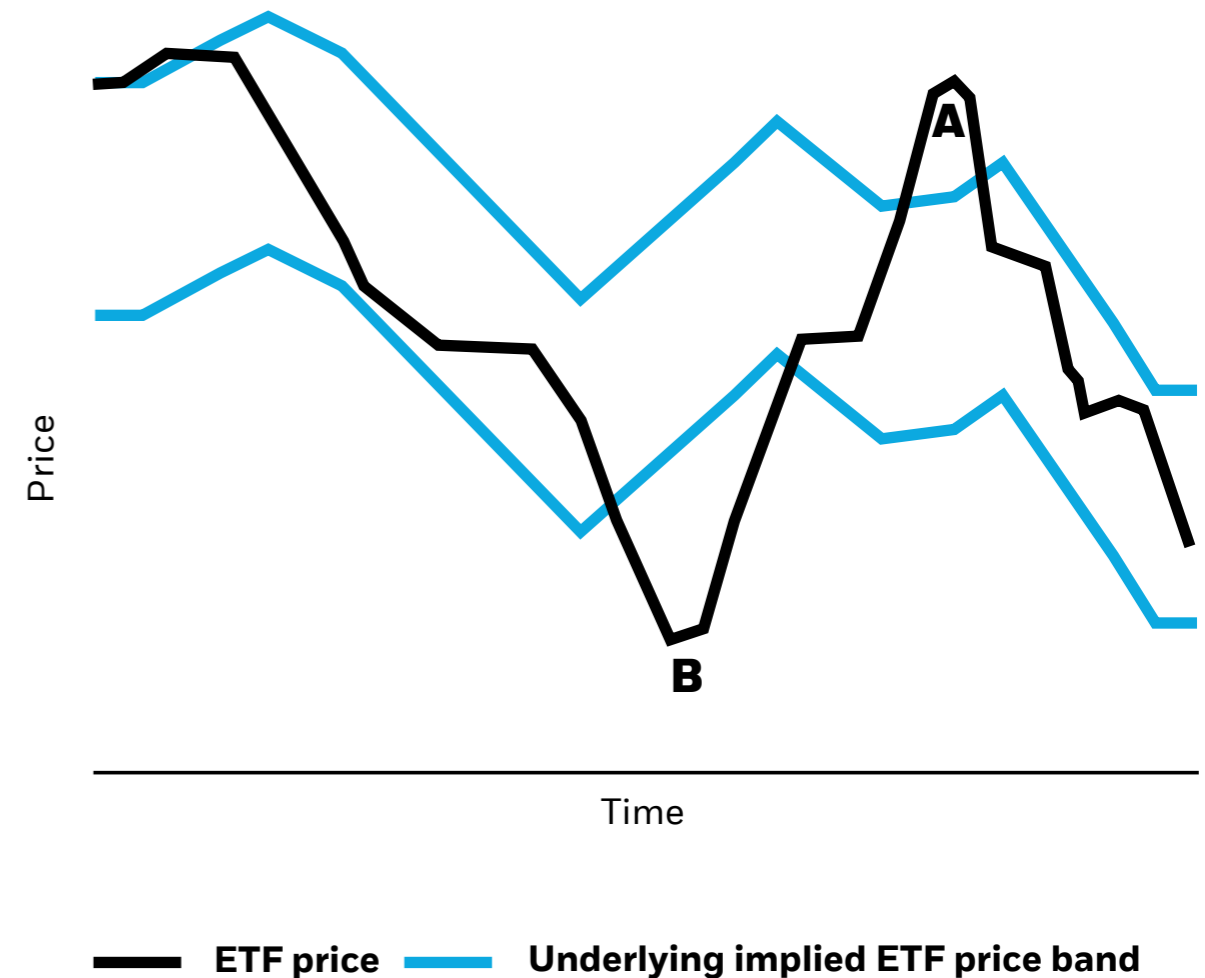
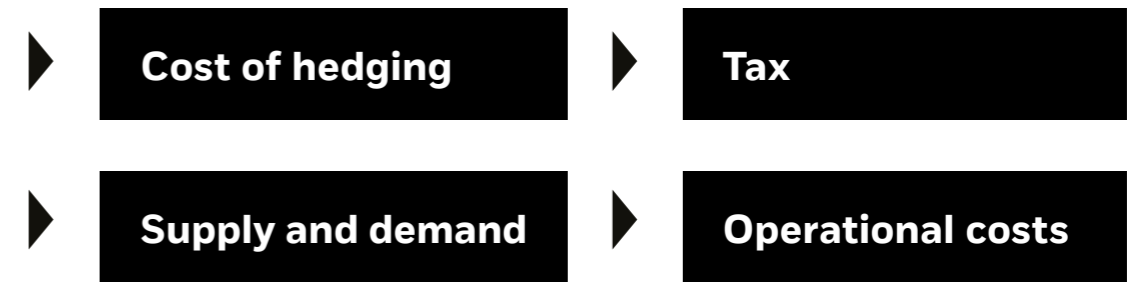
The fair value band

While ETF premiums/discounts to NAV are not uncommon, there is a reason why they don't persist indefinitely. This is because the creation/redemption mechanism unique to ETF structure allows for an arbitrage that effectively brings an ETF's price back in-line with the value of its underlying securities.

When an ETF is trading at a **premium** (above NAV), APs will buy the underlying securities at their tradeable prices and sell the ETF at its higher price, again arbitraging the spread.

When an ETF is trading at a **discount** (below NAV), authorized participants (APs)—broker/dealers authorized to create/redeem ETF shares—will sell the underlying securities at their tradeable prices and buy the ETF at its lower price, thereby arbitraging the difference.

Several factors can determine the 'fair value band', including²⁴



²⁴ Source: BlackRock. For illustrative purposes only.

Price discovery during market dislocation

March 2020 / Case study 1 - US Investment Grade Corporate Bond ETF

By looking closely at March 2020 trading activity for the USD Investment Grade Corporate Bond ETF ([ETF3]), one can see how the ETF has become a go-to tool for investors and market makers in volatile markets.

Firstly, it is important to note that bond ETFs trade frequently. This implies that their prices can incorporate more real-time information than even the most heavily-traded portfolio bonds. On March 12, 2020, the stock market experienced one of the most volatile days in history. With this particular Investment Grade Corporate ETF [ETF3] trading volumes rose sharply on this day, trading 90,000 times on-exchange. By comparison, its top five underlying holdings traded just 37 times apiece. For similar reasons throughout March 2020, this corporate bond IG [ETF3]’s daily average value traded was \$3.548bn, whereas more than half of the underlying bonds in UST Corp Bond ETF’s underlying index traded between zero and five times a day on average.

An ETF’s NAV represents an aggregate of individual bond prices that might be estimated on relatively few data points. Where a pricing source does not have a traded price for any bond on that day, the price sent to the index provider may have been an estimate based on where other bonds had printed. Selling credit bonds in a market experiencing a significant contraction in bid-side liquidity, compounded by dealers being unable to warehouse the risk on their balance sheet, led to a widening on bid/offers and a dispersion in index marks. As a result, the NAV was not necessarily reflecting where real risk was actually trading. On the other hand, the ETFs had been trading very actively during this period. The ETF effectively became the window in the real clearing price

for the market. Accordingly, ETF 3 market price could be seen to reflect high volumes of real-time market information, and the ETF represented an actionable trade for the entire portfolio at any moment.

As shown below, this resulted in this corporate IG bond [ETF3] trading at a discount to NAV in the first half of the month, and a premium to NAV in the second half. Since the announcement of the Fed and ECB’s corporate bond market support package, investors have sought to buy IG corporate bond exposures, which has increased ETF prices. At the same time, trading in the underlying bond markets has become more orderly, with a greater degree of two-way interest.



Capital at risk. You may get back less than you invested. For illustrative purposes only. **Source:** Bloomberg from 2nd March 2020 to 31st March 2020. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

March 2020 / Case study 2 - [ETF2]

One popular trade in the US Treasury (UST) market has been for leveraged funds to buy Treasuries and sell the interest rate future. The cash bonds always tend to trade slightly cheaper than the future because long positions in cash bonds carry a higher capital charge for banks than the derivative contract. After the major equity sell off in March, and rally in UST, the futures outperformed the cash bonds significantly, and sufficiently enough that some

of these leveraged arbitrage funds were forced to unwind positions. In the resulting sessions, the Long Bond Future, and its cheapest deliverable bond (T4.5% 2/2036) further outperformed near-maturity USTs—as much as 2% in price terms. During this volatility, a UST Long Bond ETF= [ETF2] seemed to enjoy a much tighter bid/offer spread than many of its US Treasury Bond index components.

US10 Comdty		97	Export to Excel	98	Settings	Cheapest-to-Deliver			
US LONG BOND(CBT) Jun20		Price	178-27	Trade	03/25/20	Delivery	06/30/20		
Sort By				Settle	03/26/20	Cheapest IRP	-0.493		
Implied Repo		Decreasing		Prices in Decimals		Days	96	Act /	360
Cash Security	Price Source	Conven Yield	Conver Factor	Gro/Bas (32nds)	Implied Repo%	Actual Repo%	Net/Bas (32nds)		
Adjust Value									
1 T 4 1/2 02/15/36	153-13	BGN	0.8886	0.8500	44.450	-0.493	0.347	11.029	
2 T 4 3/4 02/15/37	159-19 1/4	BGN	0.9289	0.8702	127.095	-6.368	0.347	91.749	
3 T 5 05/15/37	164-07 1/4	BGN	0.9348	0.8952	132.270	-6.419	0.347	95.174	
4 T 4 1/2 05/15/38	158-07 1/4	BGN	0.9861	0.8375	270.237	-17.156	0.347	237.159	
5 T 4 3/8 02/15/38	155-29 3/4	BGN	0.9639	0.8254	265.986	-17.162	0.347	233.694	
6 T 4 1/2 08/15/39	160-07 3/4	BGN	1.0560	0.8313	370.220	-24.223	0.347	337.002	

Capital at risk. You may get back less than you invested. For illustrative purposes only. **Source:** Bloomberg, 25th March 2020. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The valuation difference between ETFs and their NAVs was not solely restricted to credit funds: UST Long Bond ETF had a similar experience.

While many credit ETFs can have over 2,000 holdings in their underlying index, UST Long Bond ETF had just 42 holdings. This has typically made for a relatively straightforward calculation of the weighted-average bid price of UST Long Bond ETF's underlying Treasury bonds. As such, UST Long Bond ETF had historically traded very close to its NAV.

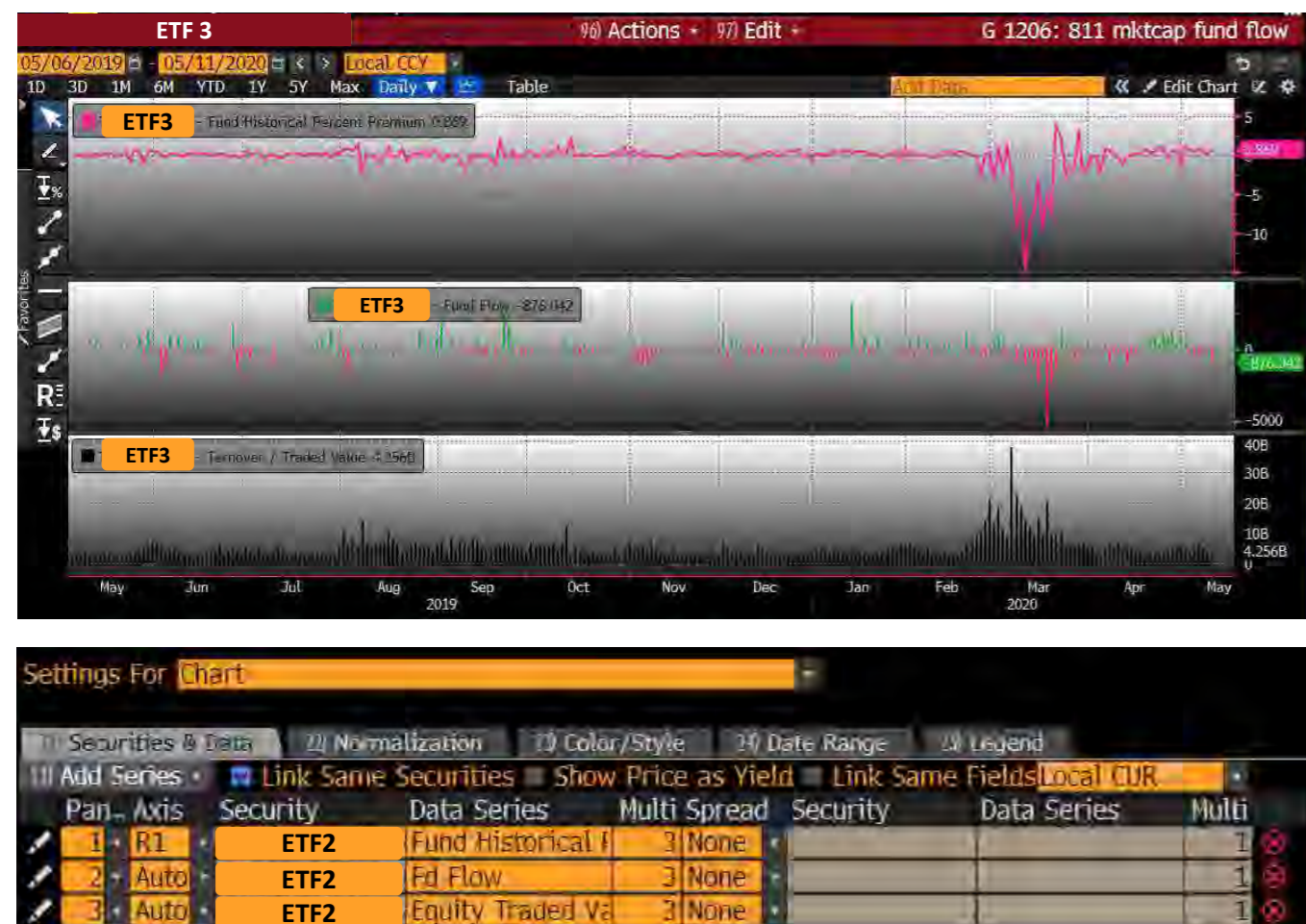
In March 2020, the US Treasury market was experiencing severe technical pricing issues and wide bid/ask spreads. Price differences in 'off the run' long maturity Treasuries were as wide as 1 point, with the long bonds moving as much as 9%

in price terms over 7 trading days. Whereas the ETFs (and UST Long Bond ETF) were trading in real time on-exchange, the bid price NAVs on the underlying (especially off the run) over-the-counter Treasuries appeared to be stale.

UST Long Bond ETF's trading activity increased rapidly throughout the month, with about USD\$4.26bn of average daily volume. (6th March 2020 UST Long Bond ETF traded \$12.672bn in one day).

As shown below, the high levels of UST Long Bond ETF's value traded suggests it was fulfilling an important role as a price discovery vehicle, reflecting real-time market sentiment while coincidentally trading at a discount to its NAV.

'Long Bond iShares' premium/discount to NAV (top panel), value traded (bottom panel)



Capital at risk. You may get back less than you invested. For illustrative purposes only. Source: Bloomberg from 2 March 2020 to 31 March 2020. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

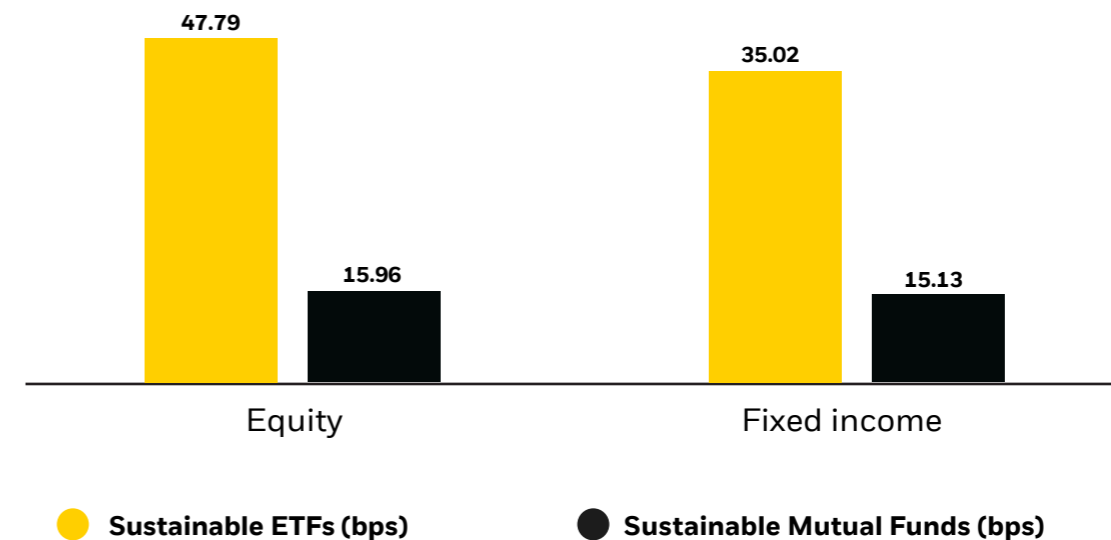
6.2 SUSTAINABLE AND TRANSITION INVESTING WITH ETFS

ETFs have expanded the availability of sustainable options for investors and their portfolios. Currently, there are nearly 1000 sustainable ETFs globally. The increasing number of sustainable ETFs, including ETFs with transition investing considerations, offer new and convenient ways for all investors to access innovative strategies in the context of the transition to a low-carbon economy.

ETFs and other indexing products are bringing transparency and accessibility to sustainable investing. Sustainable indexing can combine the traditional rules-based transparency of indexing with new, forward-looking sustainability data, providing further clarity to investors. ETFs offer affordable access to sustainable investments. For example, in EMEA, BlackRock found that the average sustainable equity mutual fund with climate components in their investment strategies has an average net expense ratio of 1.11 percentage points per year: That's more than five times the 0.20 percentage point for comparable ETFs, and significantly higher than 0.14 percentage point for

comparable iShares ETFs.¹

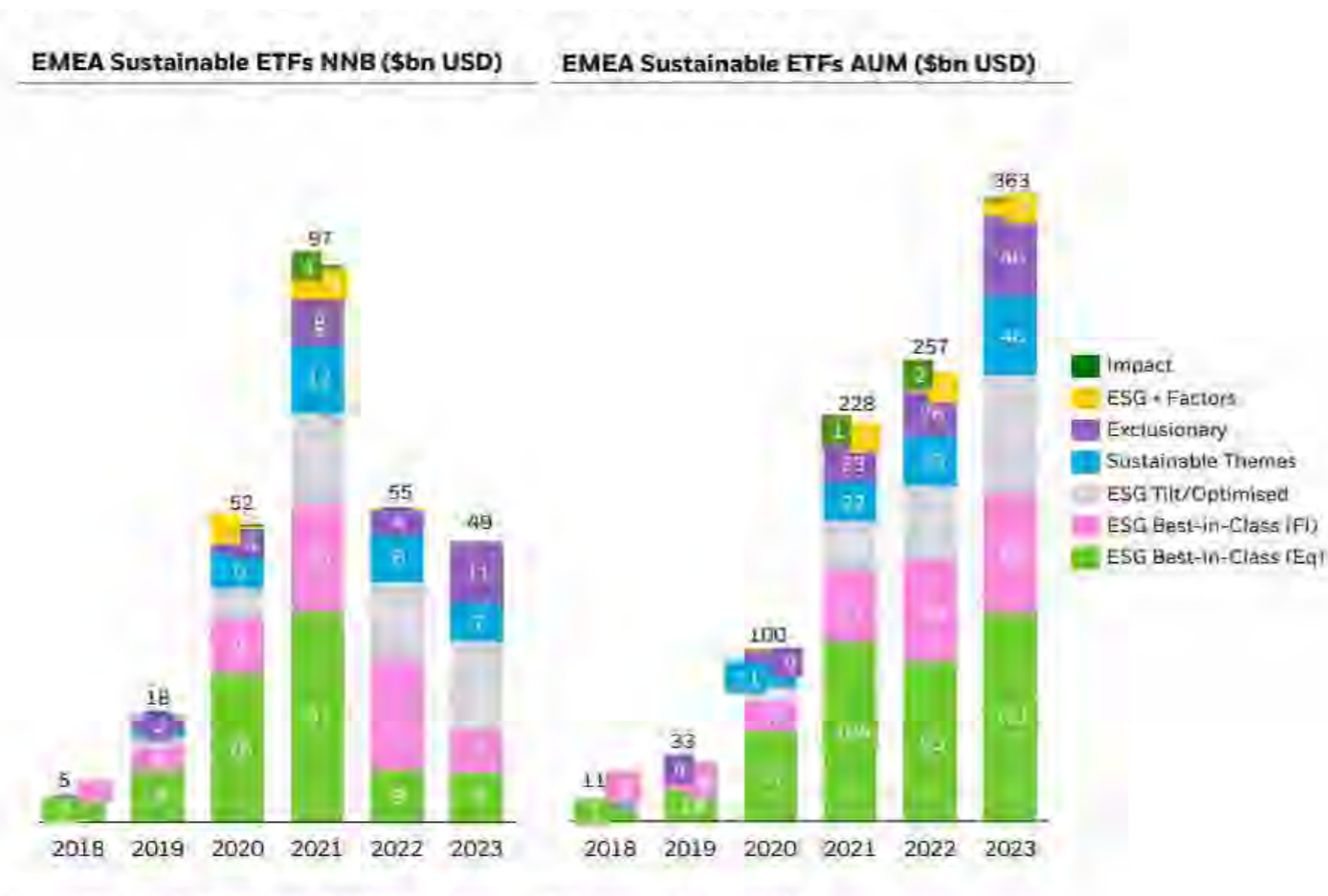
ETFs offer affordable access to sustainable investments
Comparing average costs across the industry (EMEA)



¹ BlackRock, GBI as at 29 December 2023
Source: BlackRock as at 29 December 2023. Broadridge (Mutual Funds) where Max Management Fee is included instead of exact TER.

Growth in the EMEA sustainable ETF market

Whilst flows in sustainable ETFs peaked in 2021, assets in these funds continue to grow, with sustainable ETFs representing over 15% of the entire ETF industry².



Global sustainable AUM in ETPs reached \$482 bn in sustainable assets in January 2024.

The transition to a low-carbon economy

The transition to a low-carbon economy – one of the five mega forces that we track⁴ – is set to spur a massive reallocation of capital as energy systems are rewired.

56% of surveyed institutional investors globally indicated that they plan to increase transition allocations in the next 1-3 years, and 46% said navigating the transition is their most important investment priority in the next 1-3 years³.

Source: BlackRock, 29 December 2023. ESG: Environmental, Social and Governance

2. BlackRock as of 29 December 2023.

3. BlackRock iResearch Services global survey, sample size n=200, May-June 2023. Survey covered institutional investors' attitudes, approaches, barriers and opportunities regarding transition investing.

4. BlackRock Investment Institute, <https://www.blackrock.com/corporate/insights/blackrock-investment-institute/publications/mega-forces>

Your indexing partner of choice

With iShares, clients can choose from the largest range of sustainable and transition investing building blocks and granular exposures in EMEA and globally, across equities and fixed income and all sectors of the market.

Institutional clients can contribute to drive innovation in the ETP industry by partnering with iShares to launch new sustainable and transition investing products.

Powered by BlackRock proprietary research, global expertise, and cross-functional insight-sharing, institutional clients can choose from the iShares ETFs on the BlackRock \$138B transition platform and the \$705B sustainable investing platform and design strategies at the whole portfolio level aligning to both their transition or sustainable as well and investment objectives.

Source: BlackRock, as of December 31, 2023. All \$ figures shown are USD. Our Transition Investing Platform includes private market funds, transition deals, and public market portfolios whose principal strategy either through portfolio objective or investment selection focuses on preparing for, being aligned to, benefitting from and/or contributing to the low-carbon transition. Some transition investments are portfolio investments in BlackRock private funds, which may also invest in deals that are not transition. Investments presented are made by BlackRock's funds and are not intended to represent potential direct invest opportunities. Index and active asset classes include Mutual funds, ETFs and SMA mandates. Private markets includes Private funds and SMA mandates.

Spotlight: BlackRock Carbon X-Ray

We can help clients navigate every step of their portfolio journey – from determining their carbon footprint, evaluating and selecting metrics, to selecting an investment solution and measuring progress through reporting.

Looking to identify your starting point?	Looking to identify where you want to go?	Looking to execute and show progress?
Ways we can help		
<p>Assess the current state: Analysis of current portfolio emissions footprint, both from a bottom-up and top-down lens.</p>	<p>Portfolio design: Ranging from substitution of traditional building blocks to a full strategic asset allocation redesign</p>	<p>Portfolio implementation: Across asset classes and product types (alpha seeking, index, factor).</p>
<p>Setting targets: Support clients in setting transition targets across their whole portfolio and single building blocks of the portfolio.</p>	<p>Custom solution build: Creation of custom solutions in line with client goals leveraging both proprietary and third-party datasets.</p>	<p>Reporting modules: Featuring both transition profile and risk/return profile.</p>
<p>Data selection: Identification of relevant KPIs, metrics and datasets.</p>	<p>“What if” simulation: What-if analysis on portfolio composition changes.</p>	<p>Portfolio monitoring: Support to monitor the portfolio against near-term and long-term targets</p>

Case Study

A Pension Fund is committed to decarbonising its portfolio to net zero greenhouse gas emissions by 2050. The BlackRock Carbon X-Ray team worked with the CIO to understand its specific financial and transition investing objectives. We hosted various workshops featuring BlackRock subject matter experts to discuss and determine the Pension Fund's starting point, where they want to go, and how to execute and show progress.

The BlackRock Carbon X-Ray team helped the Pension Fund align its whole portfolio towards its transition investing objectives, ensuring that the portfolio is still on track to meet its financial goals.

01 Finding your starting point

Challenge

The Pension Fund had an ambition to set a net zero target, but needed help understanding the current state of the portfolio to take action. It identified four key objectives it would need to consider:

- Lower projected carbon emissions intensity of the portfolio
- Higher allocation to low-carbon transition solutions
- Higher alignment to UN Sustainable Development Goal - Climate Action (UN SDG 13)
- Lower implied temperature rise

Solution

BlackRock conducted a full portfolio analysis leveraging BlackRock's proprietary risk analytics and a range of transition metrics to assess the portfolio's current state relative to its objectives.

Case studies are shown for illustrative purposes only, and were selected to demonstrate BlackRock's transition investing capabilities. There is no guarantee that an actual strategy will be executed or executed as shown herein, or that if executed, will be profitable. Case studies do not predict future results, even if a similar strategy is used.

02 Identifying a path

Challenge

The Pension Fund needed guidance on how to position their portfolio in the context of the transition to a low-carbon economy in order to capture opportunities and manage risks over the long term.

Solution

BlackRock redesigned the strategic asset allocation leveraging BlackRock's climate-aware capital market assumptions and a robust optimization process to seek to improve the portfolio's expected risk-adjusted returns. Through this, the portfolio's strategic asset allocation was tilted towards leaders in the low-carbon transition.

03 Implementing a solution

Challenge

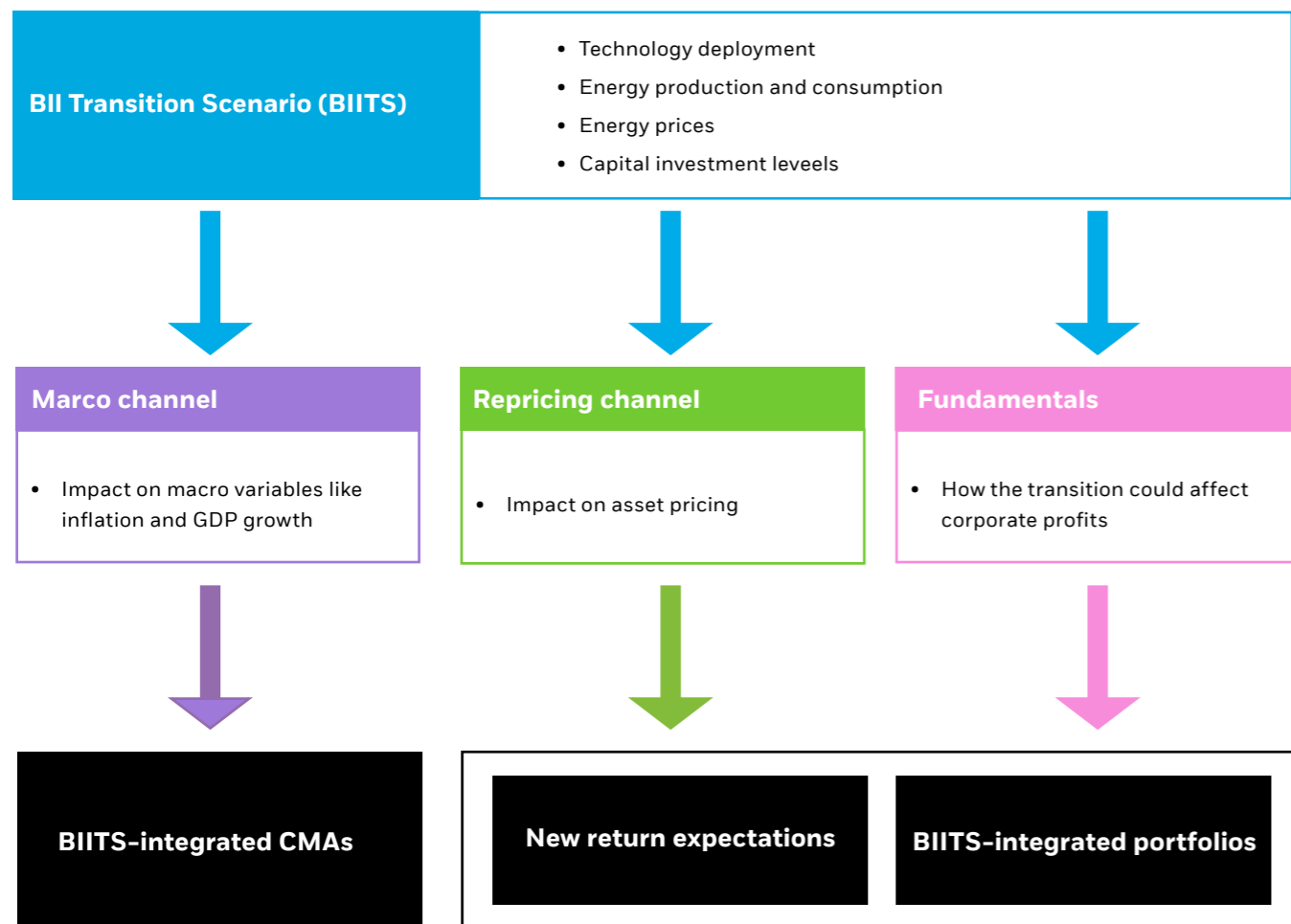
The Pension Fund wanted to implement a strategic asset allocation to products that would help them meet their portfolio's transition objectives.

Solution

BlackRock proposed implementation options, spanning asset classes and product types – including both pooled vehicles and custom SMAs. BlackRock demonstrated how the resulting portfolio compared to the original one across all of the Pension Fund's transition and financial objectives as well as ex-ante risk and stress test results.

For illustrative purposes only. These views can be subject to change without notice. Source: BlackRock Investment Institute, August 2023. Case studies are shown for illustrative purposes only, and were selected to demonstrate BlackRock's transition investing capabilities. There is no guarantee that an actual strategy will be executed or executed as shown herein, or that if executed, will be profitable. Case studies do not predict future results, even if a similar strategy is used.

Spotlight: Understanding the impact of the transition on portfolios BlackRock’s long-run estimates of risk and return across asset classes incorporates the impact of climate change across macro, repricing and fundamentals channels. Below is our framework for integrating the BlackRock Investment Institute Transition Scenario (BIITS) into our climate aware capital market assumptions and strategic portfolios. BIITS is our proprietary input-driven forecast of how the transition will likely unfold across technologies, sectors and regions.



Case studies are shown for illustrative purposes only, and were selected to demonstrate BlackRock’s transition investing capabilities. There is no guarantee that an actual strategy will be executed or executed as shown herein, or that if executed, will be profitable. Case studies do not predict future results, even if a similar strategy is used.

Leveraging and interpreting data to assess the sustainable characteristics of a fund or portfolio

Sustainability data feeds into both our risk management platform and our full investment process - from research, to portfolio construction, modelling and risk management and reporting. Our Risk and Quantitative Analysis team can use sustainability data within our global, leading risk-management platform Aladdin® to monitor indexed funds relative to their benchmarks from a sustainable perspective.

Aladdin® now includes 10000 ESG metrics. The platform combines historical and forward-looking sustainability data with models and analytics integrated into their daily workflows. Our Aladdin® platform also offers forward looking climate analytics - including physical and transition risks under different emissions pathways.

BlackRock’s portfolio management team use sustainability data in Aladdin® to assess holdings in our sustainable products at the issuer level, monitoring how this has changed and anticipating future evolutions to the indices we track. Aladdin® also allows us to interpret this sustainability data and the historical interaction with the performance of iShares ETFs’ alongside traditional risk/return drivers.



Spotlight: portfolio implications of incorporating iShares Paris-Aligned

1

Improvement of sustainability characteristics

When assessing the change of sustainability characteristics resulting from the allocation to PAB ETFs, we see a clear reduction in carbon-related metrics, such as: a reduced weighted average carbon intensity and a higher low carbon transition score.

2

Tracking error

Ex-ante tracking error versus the parent indexes is relatively modest compared to other sustainable methodologies and is higher for equity transition versus fixed income.

3

Fixed income metrics

The optimised methodology employed within the fixed income Paris-aligned indices tracked by iShares PAB ETFs results in very comparable fixed income characteristics between the traditional and Paris-Aligned indices.

4

Effects on risk and return

The differing universes do result in deviations in the ex-post risk and return profile.

1 Source: BlackRock as at June 2022. For illustrative purposes only

6.3 MORTGAGE-BACKED SECURITY (MBS) ETFs

Case study

MBS ETFs

Investor challenge

An asset owner with a USD denominated portfolio sought to enhance yield, and the reserve manager was willing to consider expanding the credit universe to achieve this goal.

However, the asset owner's investment policy for its investment portfolio would not permit securities with credit ratings below AA.

Solution

- Given their minimum credit rating tolerance, the asset owner decided to explore the US Agency Mortgage - Backed Security (MBS) market. The asset owner chose an US Mortgage Backed Security ETF, which offered:
- Diversification across sub sectors and tranche types
- Ease of execution
- On-exchange liquidity
- Exposure to a major sector of U.S. bond market: Mortgages represent \$7.1T of the U.S. fixed income market and are about 30% of the Bloomberg US Aggregate Bond Index³¹

Capital at risk. You may get back less than you invested.

31 Source: Bloomberg as at 31st December 2023

Yield differential between Bloomberg US MBS Index and 5-10 year Treasury yield



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

The operational simplicity of MBS ETFs

The management of a U.S. MBS portfolio is notoriously time-intensive. MBS pools can be operationally complex, where the sourcing and taking delivery of specified pools can be expensive and time consuming.

MBS can also be accessed via derivatives (TBA contracts). However, these require the ability to trade derivatives and must be rolled monthly.

As such, many institutions have turned to MBS ETFs to achieve broad exposure to the asset class through a one-security selection. The ETF itself is diversified across sub sectors and tranche types.



An agency MBS ETF trading volume and fund flows

An Agency MBS ETF has enjoyed a high daily volume of value traded (aggregate share volume). In 2023, an Agency MBS ETF has had days where turnover has exceeded 500mm/day.³²

As shown on the following page, an Agency MBS ETF's secondary market trading volume has been relatively higher than its fund flow (creation/redemption activity).

A US mortgage backed ETF showing an MBS ETF's traded value, daily fund flow and market capitalisation



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown.

³² Source: Bloomberg as at 31st December 2023

Comparing MBS returns

The below chart compares the following MBS returns:

An MBS ETF = [ETF7]

The ETF returns are NAV returns and net of fees. Please note ETF7 expense ratio has fallen over time.

Bloomberg US MBS Index (LUMSTRUU)

LUMSTRUU does not reflect transaction costs from monthly rebalancing that results in 20-30% turnover per year.

Bloomberg REMIX portfolio TBA Proxy Total Return (I21254US)

This tracks a TBA strategy, and is rebalanced monthly. It is composed of a portfolio of 12-18 liquid TBA contracts designed to track the performance of the Bloomberg fixed rate U.S. MBS Index.



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown. **The figures shown relate to past performance. Past performance is not a reliable indicator of current or future results.** Performance is for illustrative purposes only. Index performance does not reflect any management fees, transaction costs or expenses. Indices are unmanaged and one cannot invest directly in an index.

MBS ETF vs. TBAs

Buying an ETF can give investors access to more seasoned securities in the U.S. Agency Mortgage market, which can be difficult to source in the secondary market. A mortgage backed ETF is comprised of approximately 97% physical securities backed by mortgage pools.³³ Physical pools can have more predictive prepayment and

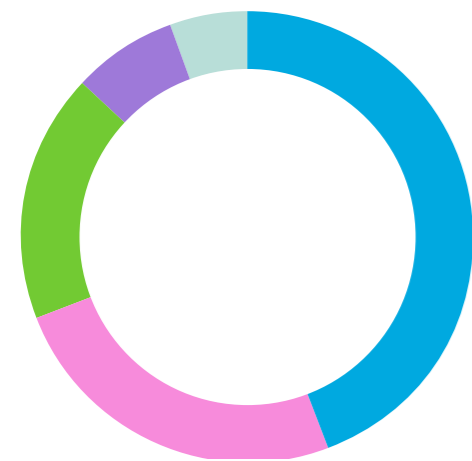
convexity characteristics relative to TBA contracts, which have an embedded “Cheapest To Deliver” option. Newer issued mortgage backed security issues have a higher propensity to prepayment risk. This can cause TBAs to underperform seasoned indices when rates are volatile and fall as evidenced during the October 2018-2019 period.

MBS ETF: A TBA complement

Currently, TBA forward contracts are one of the dominant vehicles used to invest in the U.S. mortgage market. However, MBS ETFs (and other mortgage backed security ETFs) offer a number of potential advantages relative to TBAs, including operational simplicity, a better convexity profile, and competitive holding costs.

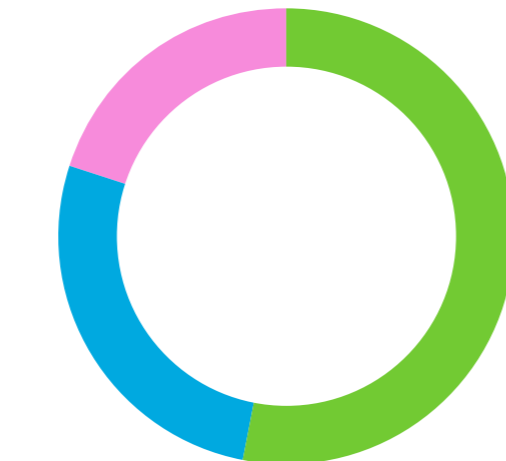
Comparison Analysis

A mortgage backed ETF



30 Yr FNMA	16.20%
30 Yr GNMA	22.60%
30 Yr FHLMC	49.40%
15 Yr FNMA	5.00%
15 Yr FHLMC	6.80%
15 Yr GNMA	0.00%
Other	0.10%

[ETF7]



30 Yr UMBS	53.26%
15 Yr UMBS	19.97%
GNMA	26.77%

Source: BlackRock Solutions, Bloomberg as of 12/29/23. Allocations subject to change. “TBA Strategy” represented by a TBA index replicating portfolio derived from the Bloomberg REMIX Portfolio TBA Proxy. This information should not be relied upon as research, investment advice or a recommendation regarding the Funds or any security in particular. This information is strictly for illustrative and educational purposes and is subject to change. The TBA Strategy does not represent the actual current, past or future holdings or portfolio of any BlackRock client.

A mortgage backed ETF portfolio composition and risk profile

MBS ETF = A US mortgage backed ETF

Physical mortgage pools can have more predictable prepayment and convexity characteristics relative to TBA contracts, which have an embedded “Cheapest To Deliver” option.

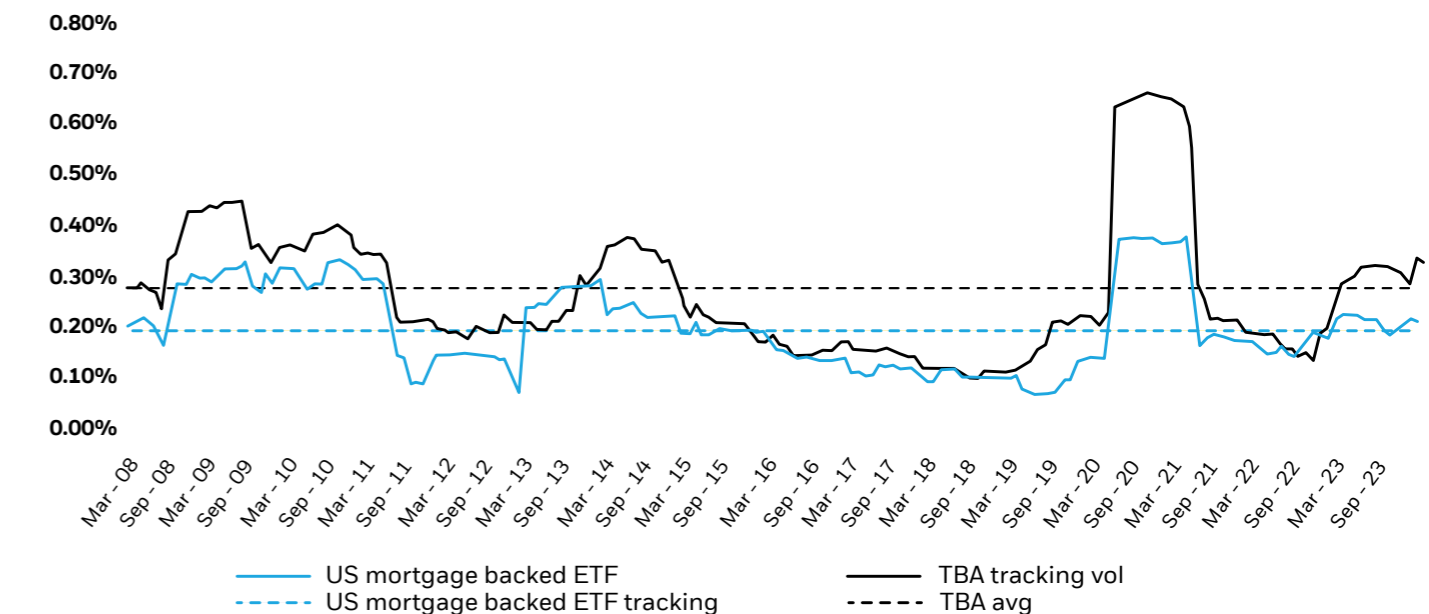
The mortgage backed ETF has exhibited less tracking volatility to the Bloomberg U.S. MBS Index than TBA replication strategies over both short and longer-time periods. The chart below illustrates the mortgage backed ETF's tighter index tracking volatility to the Bloomberg U.S. MBS Index, versus the Bloomberg TBA REMIX Index.

Portfolio characteristics comparison⁶²

	An iShares MBS ETF	TBA Strategy
Convexity	0.04	-0.99
Duration	5.77	3.38

62 Source: Source: BlackRock Solutions as of 12/29/2023. 'TBA Strategy' represented by TBA risk slice of a US mortgage backed ETF

Index tracking volatility comparison³⁵



35 Source: BlackRock Solutions, Bloomberg. TBA tracking volatility is based on the Bloomberg REMIX Portfolio TBA Proxy Index, as of 12/29/2023. Tracking volatility is the annualized standard deviation of the excess returns of a portfolio versus its benchmark index. Mortgage backed ETF tracking volatility is based on NAV excess total returns.

Comparing a mortgage backed ETF and TBA strategies using Bloomberg COMP

The graph below compares 5-year performance of the an 'US Agency MBS ETF' to its underlying index (LUMSTRUU) and the TBA proxy (I21254US). As shown, the TBA proxy significantly underperformed for the specified time period.

Comparing 'ETF = a US agency mortgage back ETF' and TBA strategies using Bloomberg COMP



For illustrative purposes only. This is to illustrate Bloomberg functionality and is not intended as an offer of the ETFs shown. **The figures shown relate to past performance. Past performance is not a reliable indicator of current or future results.** Performance is for illustrative purposes only. Index performance does not reflect any management fees, transaction costs or expenses. Indices are unmanaged and one cannot invest directly in an index.

- ▶ Asset owners who invest in MBS through TBA roll strategies have suffered quite sharp tracking error to the Bloomberg US MBS Index (LUMSTRUU) over time, as TBAs have exhibited higher prepayment features in the recent rates environment.

6.4 THE TAXATION OF AN ETF MAY ARISE AT 3 LEVELS

Sources of WHT

Levels of tax

Dividends and distributions

1

The ETF portfolio holdings

The ETF may pay withholding or capital gains tax on dividends or interest received from portfolio holdings, or on the sale of those assets. Exempt tax investors **cannot** claim back taxes incurred at the portfolio level of the ETF, e.g. withholding taxes on dividends received by the ETF.

2

The ETF

Withholding taxes on distributions by the fund to its investors. Funds are often exempt from corporate tax on the fund level.

3

The Asset owner itself

MSCI ACWI Withholding tax example

Portfolio level: This is subject to the underlying geographic exposure and ETF domicile

1 ETF/portfolio level

ETF / portfolio level

The type (such as equities or bonds) and the domicile of the investment will have an impact on whether the ETF is subject to any at source taxes on income or capital gains.

ETF portfolio securities dividends and interest distributed to the ETF

ETF level

ETFs are often exempt from corporate tax. Withholding tax on ETF distributions may apply in certain fund domiciles.

Taxation of the ETF and distributions to the investors

Investor level

An institution might be subject to taxation on income and capital gains.

Subject to the Central Bank taxation regime on income and capital gains

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Payments from ETF portfolio securities will be subject to either a statutory tax rate or tax treaty rate based on the domicile of the security and ETF.

Benchmarks, such as the MSCI ACWI, include securities in various domiciles with differing tax rates applicable on income and gains.

The net benchmark return is generally based on the statutory tax rates on distributions by the benchmark securities. In comparison, in case of the ETF, the net effective tax rate often differs from the benchmarks' as the ETF tax position also considers applicable tax treaty rates.

Example

An 'exempt investor' such as a **40 ACT US-domiciled ETF investing** in U.S.-domiciled equities **will not be subject to withholding tax (WHT)** on U.S. dividend income. U.S. Dividends will be subject to **15% WHT** if they are distributed to an **Irish ETF**, and **30%** if distributed to an **index mutual fund** domiciled in **Ireland or Luxembourg**.

French dividends will be subject to **0% WHT** if they are distributed to an Irish ETF, **15%** to a **40 ACT US-domiciled ETF**, and **0%** to an Index mutual fund domiciled in **Ireland** or in **Luxembourg**.

Calculation

$$\begin{array}{l}
 \text{Country weight} \times \text{Country yield} = \text{Index weighted dividend yield} \\
 \text{Index weighted dividend yield} \times \text{Net WHT rate} = \text{Tax impact}
 \end{array}$$

In the case of an ETF tracking the MSCI World index, with the index components being domiciled in various jurisdictions globally, the total portfolio- level WHT impact is an important consideration. It may have a greater impact than the headline expense ratio on the performance of an ETF.³⁶

MSCI All Country World Net total return index				Net return benchmark		iShares Irish ETF		German iShares ETF		US iShares ETF - tax exempt		BlackRock Irish unit trust		Luxembourg SICAV	
Country of domicile	Country weight	Country yield	Index weighted div yield	Net WHT rate	Tax impact	Net WHT rate	Tax impact	Net WHT rate	Tax impact	Net WHT rate	Tax impact	Net WHT rate	Tax impact	Net WHT rate	Tax impact
USA	61.58%	1.70%	1.05%	30.00%	0.31%	15.00%	0.16%	30.00%	0.31%	0.00%	0.00%	30.00%	0.31%	30.00%	0.31%
Japan	5.22%	2.86%	0.15%	15.32%	0.02%	15.00%	0.02%	15.00%	0.02%	10.00%	0.01%	15.00%	0.02%	15.32%	0.02%
Great Britain	4.01%	3.73%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Canada	3.21%	3.14%	0.10%	25.00%	0.03%	25.00%	0.03%	15.00%	0.02%	15.00%	0.02%	25.00%	0.03%	25.00%	0.03%
Switzerland	2.90%	2.89%	0.08%	35.00%	0.03%	35.00%	0.03%	15.00%	0.01%	15.00%	0.01%	35.00%	0.03%	35.00%	0.03%
France	2.69%	3.18%	0.09%	26.50%	0.02%	0.00%	0.00%	0.00%	0.00%	15.00%	0.01%	0.00%	0.00%	0.00%	0.00%
China	2.57%	2.29%	0.06%	10.00%	0.01%	10.00%	0.01%	10.00%	0.01%	10.00%	0.01%	10.00%	0.01%	10.00%	0.01%
Germany	1.86%	3.77%	0.07%	26.37%	0.02%	15.00%	0.01%	15.00%	0.01%	15.00%	0.01%	15.00%	0.01%	15.00%	0.01%
Australia	1.82%	4.89%	0.09%	30.00%	0.03%	30.00%	0.03%	30.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
India	1.65%	1.20%	0.02%	23.92%	0.00%	10.00%	0.00%	10.00%	0.00%	23.92%	0.00%	23.92%	0.00%	23.92%	0.00%
Taiwan	1.37%	5.22%	0.07%	21.00%	0.02%	21.00%	0.02%	21.00%	0.02%	21.00%	0.02%	21.00%	0.02%	15.00%	0.01%
Korea	1.21%	2.40%	0.03%	22.00%	0.01%	15.00%	0.00%	22.00%	0.01%	16.50%	0.00%	15.00%	0.00%	15.00%	0.00%
Netherlands	1.14%	2.48%	0.03%	15.00%	0.00%	15.00%	0.00%	15.00%	0.00%	15.00%	0.00%	15.00%	0.00%	15.00%	0.00%
Sweden	0.76%	3.02%	0.02%	30.00%	0.01%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hong Kong	0.75%	4.80%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ireland	0.66%	1.46%	0.01%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Brazil	0.66%	11.32%	0.07%	25.00%	0.02%	25.00%	0.02%	15.00%	0.01%	15.00%	0.01%	25.00%	0.02%	15.00%	0.01%
Denmark	0.65%	2.08%	0.01%	27.00%	0.00%	15.00%	0.00%	27.00%	0.00%	15.00%	0.00%	15.00%	0.00%	15.00%	0.00%
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total portfolio level WHT impact				0.56%		0.33%		0.46%		0.14%		0.47%		0.46%	

Total portfolio level withholding tax (WHT) impact = The lower the WHT tax impact, the better it is for the institution.

36 Source: All tax data is for illustration purposes only and does not represent tax advice. The content of the information provided is for information purposes only and is meant to provide investors and intermediaries with an overview. This information is not intended to, nor does it, provide specific investment or tax advice, or to make any recommendations about the suitability of iShares for the circumstances of any particular investor. We recommend that clients consult with their own independent tax advisor should you have any further queries about how investing in an iShares fund will affect their tax position.

Taxation of the ETF

This is subject to ETF domicile

2 ETF Level

The ETF's country of domicile may impose corporate tax on the ETF or withholding tax on any distributions by the ETF to its investors.

The U.S. generally imposes 30% withholding taxes when a U.S.-domiciled ETF makes a distribution to non-U.S. investors. However, this withholding tax rate may be reduced to 15% or 0% depending on the tax treaty in place between the ETF and investor domicile, provided the investor provides form W8BEN to the US tax authorities.

Ireland does not impose any withholding taxes when Irish funds distribute income or gains to overseas investors.

As can be seen from the examples provided, an ETF would suffer U.S. withholding tax at 0% or 15% or 30% on U.S.-sourced income from its portfolio holdings depending upon the country of its domicile, its status and the tax treaty with the U.S.

No further withholding tax is levied on the distribution by the Irish ETF to its investors in U.S. withholding tax may be charged on distributions made by a U.S.-domiciled ETF to its investors.

1

Investment level tax

2

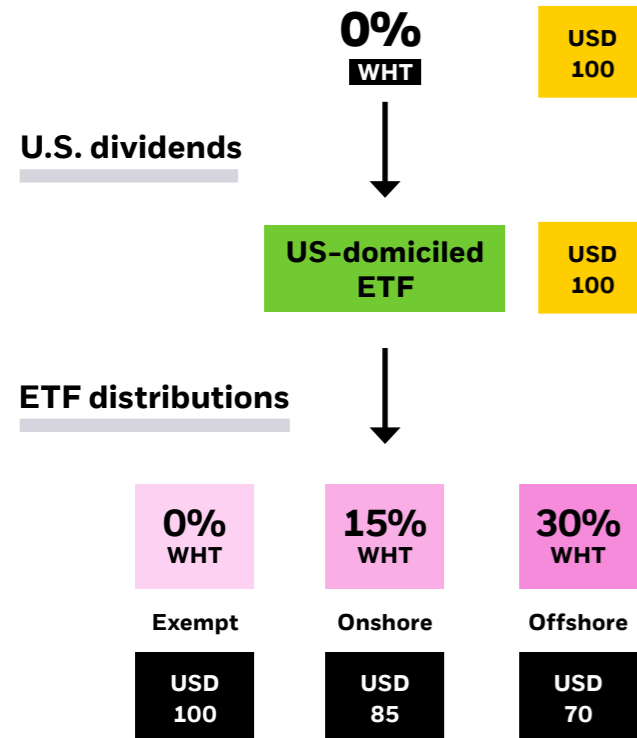
ETF level tax

Withholding tax

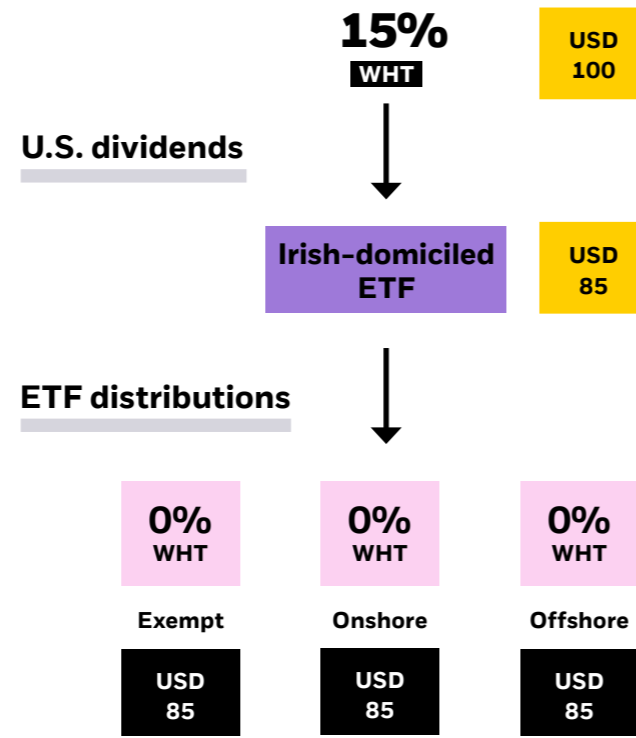
The country of domicile of the ETF may impose a withholding tax on any distributions made to its investors on the basis of the tax position and the residence of the investor. The withholding tax rates can vary depending on the fund domicile.

Tax impact on U.S. exposure³⁷

U.S. Equities



U.S. Equities



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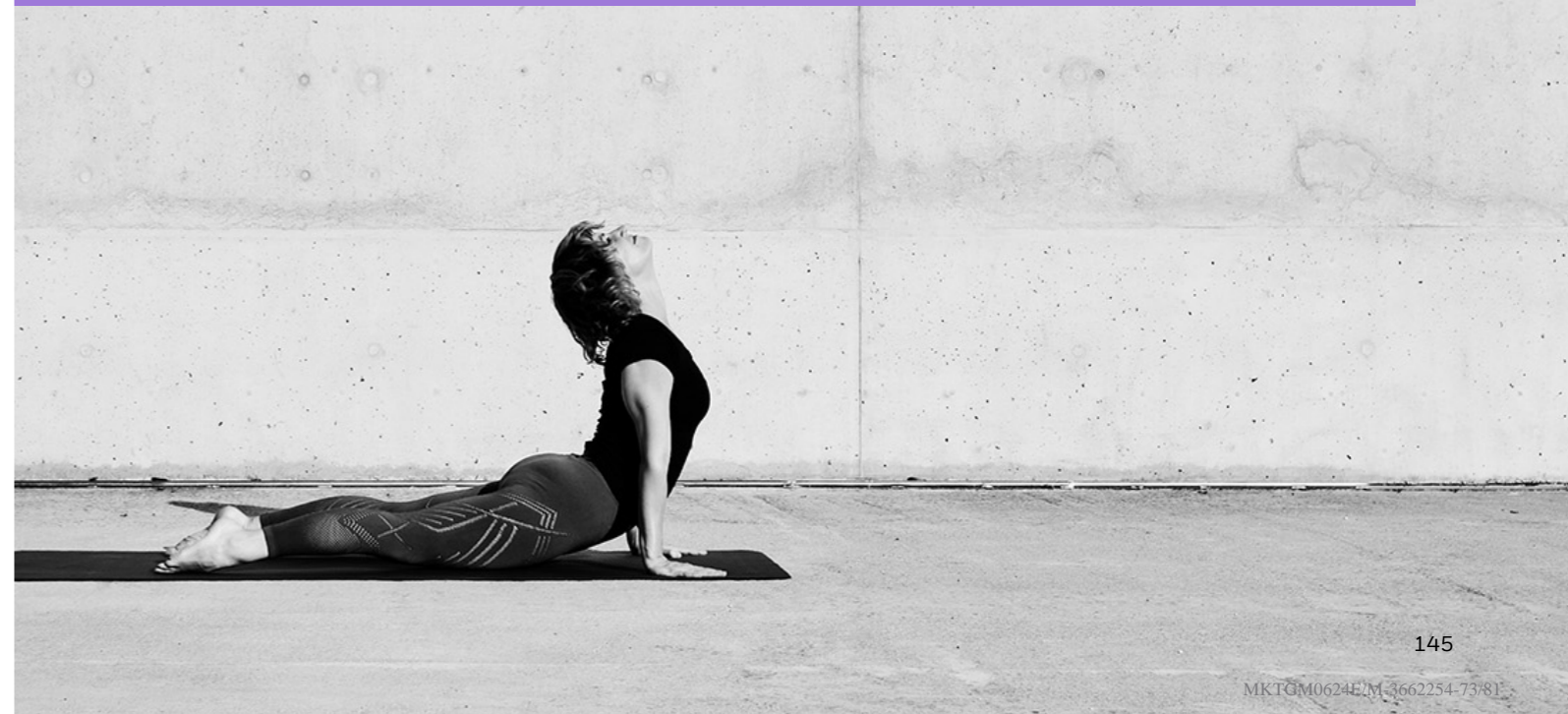
6.5 TRANSITIONING FROM FUTURES TO ETFs

ETFs can be more cost efficient instruments than the like-for-like funded future. The funded future's inefficiencies (Tracking Difference) can arise from mispricing of the contract or funding gap of collateral compared to the implied funding of the future. Additionally ETFs can offer exposure at a lower volatility of tracking (Tracking Error) compared to futures as there are no estimation used to drive the pricing, such as implied funding or estimated dividends amounts over the period.

ETFs can offer precision implementation by tracking the exact benchmark required and not the closest proxy. This avoids any benchmark mismatch (for example tracking

MSCI Europe via Euro Stoxx 50 instruments). ETFs also can offer broader investment choices around the same exposure including ESG consideration, currency hedged exposures, or Accumulating vs. Distributing instruments.

ETFs can offer implementation with lower operational overhead compared to alternative funded futures as the instrument would require no rolling or collateral management. Furthermore broad benchmarks such as MSCI World or ACWI could require a basket of futures and related collateral management in different currencies with different maturities, compared to a single line ETF implementation.



Transitioning from futures to ETFs

Case study

Some asset owners have implemented their equity exposures through futures contracts. Like ETFs, futures may be easy to execute, liquid, and have transparent pricing. However, extra costs may be associated with futures holdings as they require quarterly rolls between front month contracts to the next expiry. Additionally, futures may have limited liquid offerings around widely used indices and their ESG implementations.

For these reasons, some asset owners have decided futures are not ideal for a reserves portfolio. They have instead opted to transition to an ESG ETF, offering comparable equity exposure.

In these cases, there is typically some overlap between the underlying share holdings of the index which the futures position tracks and the ESG ETF. This could lead to reduced transition costs, as these underlying securities can be used to create units of the ETF rather than presenting to outright trades.

An asset owner was looking to exchange a long Euro Stoxx 50 futures position for the a 'European EMU ESG equity ETF'. A broker makes a 2-way quote for the switch.

Sell the future (basis quote). Buy the ETF (NAV quote)



For illustration purposes only.

Capital at risk. You may get back less than you invested.

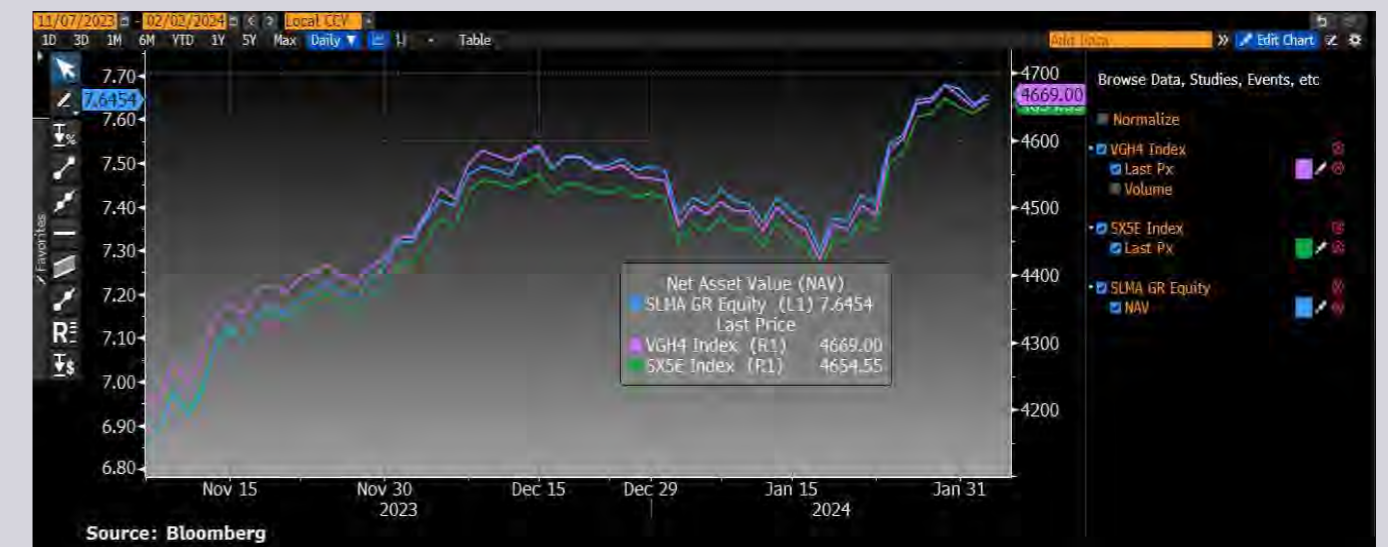
Comparing ETF, futures, and index pricing levels

The asset owner gets an exchange for physical (EFP) quote of + 14.45 points (yellow value previous page = basis) to sell the future and a quote of NAV +12 bps to buy the ETF. The broker then uses the EFP market to quote the 'fair value' of the future versus the underlying index at the index closing price. In this example

The index closes at **4654.55 (green line)**, and thus the broker bids **4669 for the future (lilac line)** = $(4654.55 + 14.45 = 4669)$

The **ETF NAV** closes at **7.6454 (blue line)**, and thus the broker sells the ETF to the asset owner for $[(7.6454 + (7.6454 * 0.12\%)) = 7.6544]$

Instead of delivering the underlying securities, the broker rebalances the basket and creates units of the ETF to deliver to the asset owner, incurring only creation costs typically associated with ETF primary market activity.



For illustration purposes only.

Settings For Chart						
1 Securities & Data		2 Normalization		3 Color/Style		4 Date Range
Add Series		Link Same Securities		Show Price as Yield		Link Same Fields
Pan...	Axis	Security	Data Series	Multi	Spread	Security
1	R1	VG4 Index	Last Px	1	None	1
1	R1	SX5E Index	Last Px	1	None	1
1	Auto	ETF 9	NAV	1	None	1

Sample only.

For illustration purposes only.

Reviewing the transition trades

Case study

To summarize the example on the previous page:

The asset owner sold the futures at 4669
The asset owner bought the ETF at 7.6544

As shown in the graph on the opposite page, these two pricing levels are in-line, demonstrating that the transition from futures to ETFs was achieved with relative ease and pricing efficiency. Looking at these prices over the previous several weeks, the graph shows that they have historically moved in-line with each other.

Theory behind futures pricing

Future price = index price – dividends + rates
Basis = futures price – index price

Hence, the basis is driven primarily by expected dividends and implied funding rates from the present to the futures' expiry.

“Exchange for physical” (EFP) is a highly liquid trade type where brokers quote prices for exchanging futures for the underlying stock basket (and vice versa). The price will be a reflection of the fair basis and is often benchmarked to the index closing level.

Capital at risk. You may get back less than you invested.

6.6 SECURITIES LENDING

ETFs and securities lending

The long and short of it

Institutions can potentially enhance yield by lending financial instrument ETFs. ETFs with strong borrow demand create lending opportunities and the potential to generate income for long-term ETF holders.

Here's how it works:

A large financial institution pays a fee and provides collateral to borrow a stock or bond. The fund or account keeps the collateral to secure repayment in case the borrower fails to return the loaned security. The collateral is required to be at least equal to the market value of the loaned security. The borrower typically uses the loaned security to hedge against market risks, to facilitate a short sale, or as collateral in another transaction.

Key questions to ask:

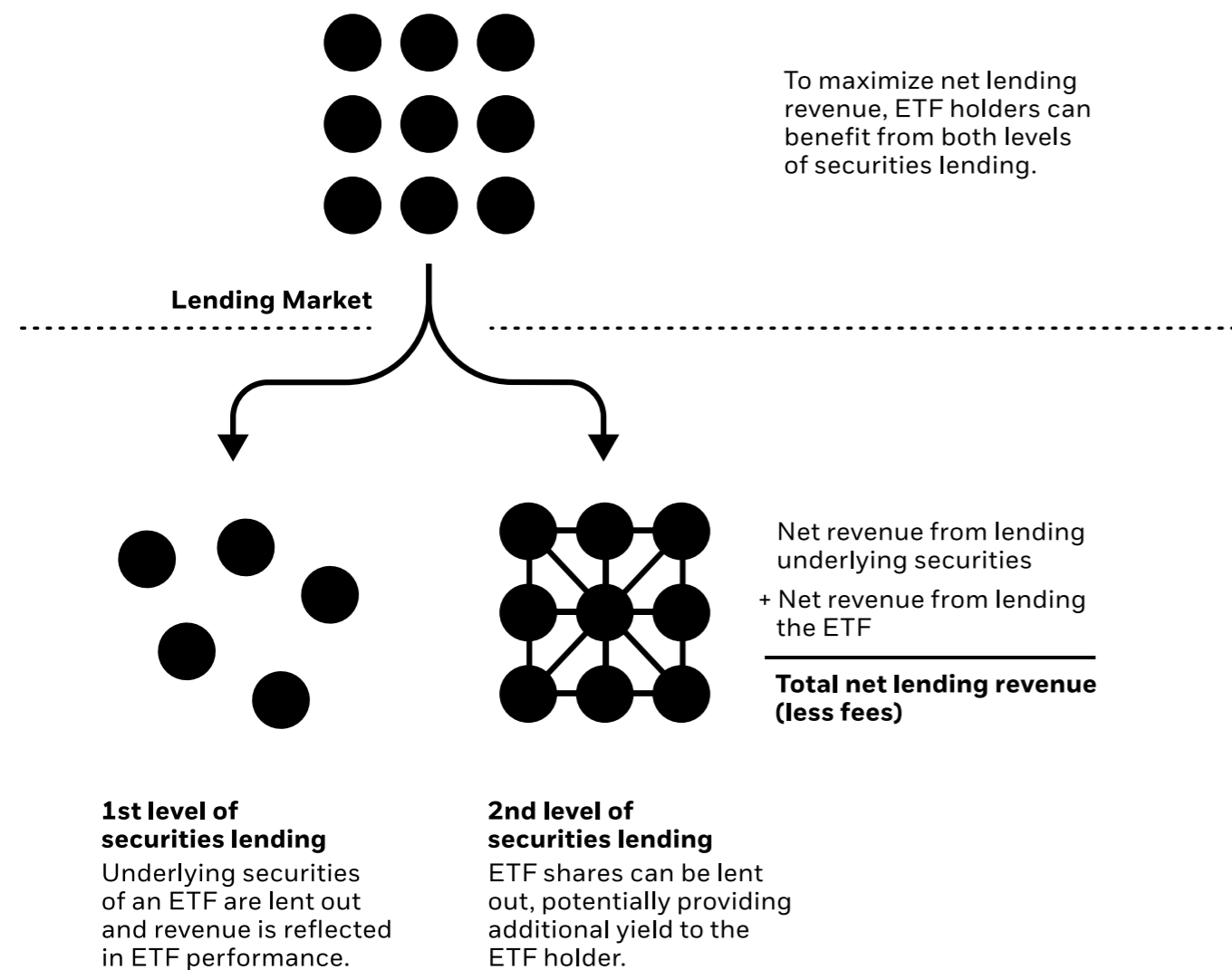
- 1 Does a fund participate in securities or unit lending?
- 2 What is the level of securities lending revenue and how is it split between the fund and the securities lending agent?
- 3 Are there clear guidelines for collateral selection, rigorous risk management processes?
- 4 Does the lending agent provide an indemnity against borrower defaults?
- 5 What is the potential lending revenue return from loaning the ETF unit?

Risk: With securities lending there is a risk of loss should the borrower default before the securities are returned, and due to market movements the value of the collateral held has fallen and/or the value of the securities on loan has risen.



Setting up ETF lending

All major custodians have a platform to lend securities and make the client experience as seamless as possible. The lending agent typically manages the operational aspects of securities lending transactions. Once established in a lending program, the process is very low touch for beneficial owners.



BlackRock's approach to securities lending

The potential for yield enhancement

BlackRock brings an investment management approach to securities lending, applying risk management, proprietary technology, and the benefits of integration across our trading and liquidity functions and affiliation with portfolio management teams.

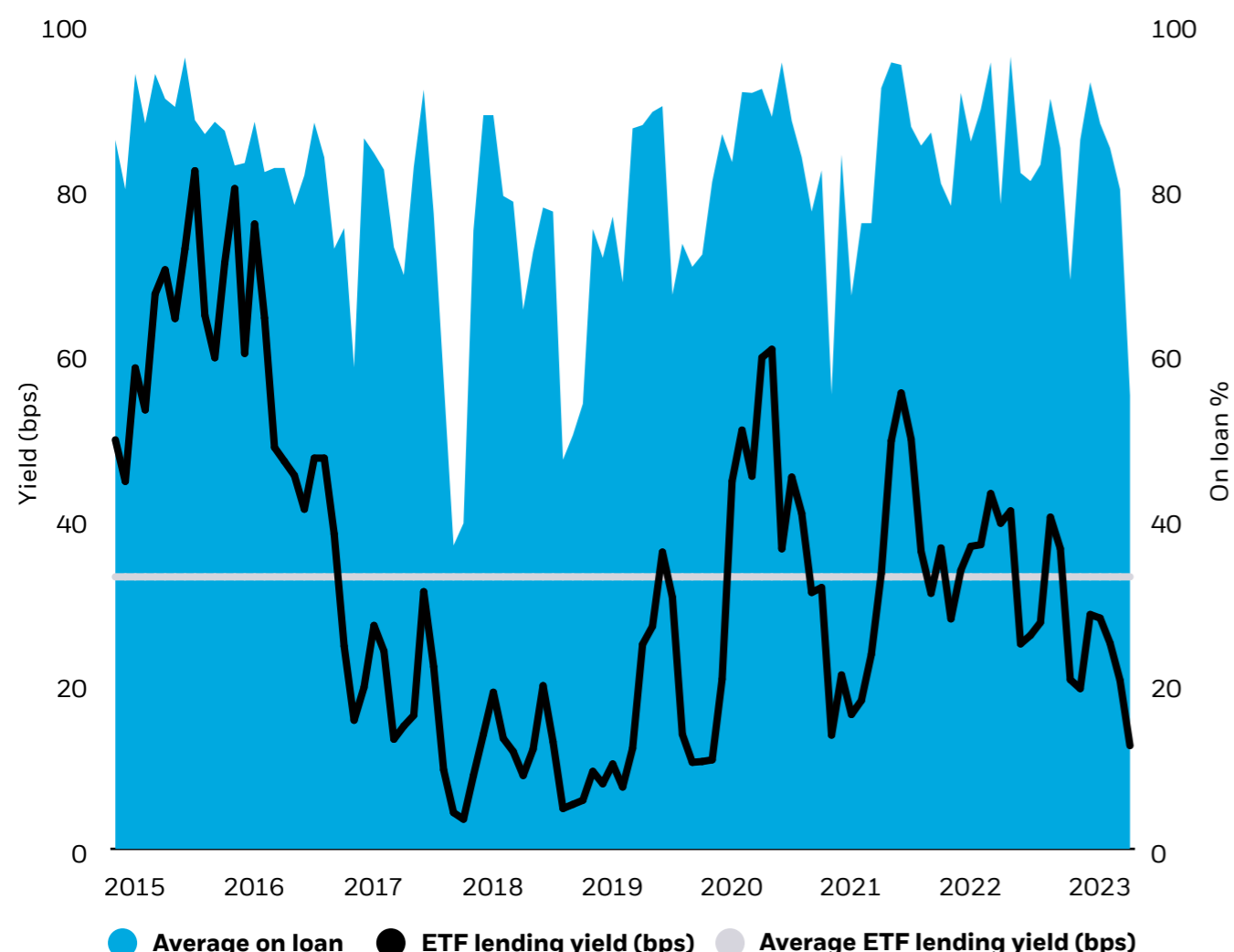
The lending landscape of each ETF varies based on the characteristics of the underlying holdings and market conditions.

For example, small-cap stocks—such as those represented in the Russell 2000 Index—typically have less liquidity than large-cap stocks. The relative scarcity has resulted in wider lending spreads of the individual securities and of ETFs that hold the underlying securities.

Further, in bearish market conditions, borrower demand for small-cap stocks tends to increase. Investors with a long position in a US equity fund can aim to take advantage of this by engaging in securities lending to help offset the expense ratio and generate additional income potential.²³

23 Source: BlackRock, Bloomberg, and Markit, 31st July 2022.

Example of a US equity ETF gross unit lending yield²³



“ETF Level Lending Yield” represents annualized gross yield on lending the ETF for the 1-mo trailing period.

“ETF Level Utilization” represents the average percent of the fund’s net assets that were on loan for funds for the 1-mo trailing period.

Source: Markit. December 2023.

“ETF Level Lending Yield” revenue is not an element of fund performance nor a service provided by iShares ETFs or BlackRock Fund Advisors (“BFA”), the funds’ investment advisor. The lending yield represents annualized gross yield on lending the ETF and is not inclusive of the yield earned on cash collateral. Actual revenue splits and cash reinvestment vehicles are negotiated between the lender and the lending agent and may vary. The analysis does not reflect transaction costs, including commissions and impact/spread, which would be incurred on the purchase and sale of the ETF. The investor’s securities lending agent will receive a share of the gross lending revenue (“revenue splits”) and are not included in the gross yield figures shown.

There is no guarantee that there will be borrower demand for shares of the iShares Funds, or that securities lending will generate any level of income. Distributions paid out of the Fund’s net investment income, including income from securities lending, if any, are taxable to investors as ordinary income.

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Risk Warnings

Capital at risk

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