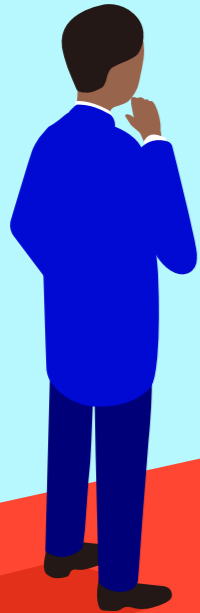


ETFs

or

futures?

Roll cost analysis
September 2021



ETFs versus futures

In this report, we look at some of the world's most widely followed indices and examine the costs of two of the most popular choices for gaining exposure to them, ETFs and futures.

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Many investors historically used futures because they believed they were cheaper in terms of the all-in cost of holding. However, fundamental changes within both the futures and ETF markets in recent years means this generalisation is no longer accurate:

- Futures pricing has been impacted by higher capital costs and lower risk appetite by banks, driven primarily by regulatory changes since the financial crisis.
- The European ETF market has become more competitive, with management fees falling sharply for the most liquid indices.

Unfortunately, because ETFs and futures are very different instruments, comparisons between them tend to be more theoretical than practical and require many assumptions. In this document, we describe a more intuitive way to compare them, based on their actual performances.

Please note this report is produced quarterly, using the same method for cost comparison and each time analysing the same indices.



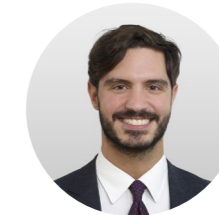
Contact us

To discuss how we might be able to help in relation to your ETF trades or for further analysis on this subject, please contact your usual Invesco representative or a member of the capital markets team – ETFtrading@invesco.com

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The current situation

Recent roll history and Q3 '21 roll analysis

In our 2020 roll cost comparisons, we captured the important market correction we witnessed in March last year on the back of the events triggered by the first wave of COVID-19. Unexpected dividend cuts, central bank slashing interest rates and lower demand resulted on cheaper futures across the board, with European underlying being affected the most.

After the shock, futures costs mostly rebounded in line with pre-March 2020 levels, with a few underlying index specific idiosyncrasies.

Whilst the last roll we analysed (Q2 '21), was less favourable for many ETFs in scope of this analysis, the September roll (Q3 '21) was more nuanced, with The S&P 500 and MSCI World comparisons consistently positive for the ETFs, a positive quarter also for the FTSE 100 ETF, but a very cheap roll for European underlying.

As a reminder, in our cost/yield calculations, we consider what an investor might have faced when rolling into the contract that has just expired, rather than rolling out of it.

It is also important to keep in mind that Q2 '20 results and bar charts display annualized results in basis points, hence amplifying the effects of the unprecedented market environment (please reference "[How we compare ETFs and Futures](#)" at the end of this brochure for more details on methodology and assumptions).

MSCI World and S&P 500 favoured the ETF

Our analysis shows that holding the Invesco S&P500 ETF could have resulted in 38bps savings over the past 4 rolls (1 year), with the ETF now fully benefiting from the recent performance improvements, bringing the ETF cost down to 5bps.

The S&P 500 CFTC commitment of traders' charts, a good indicator of contracts demand and pressure on the roll cost, shows that asset managers' net long positions kept rebounding back since the March/July lows in 2020, but remains below pre-pandemic levels.

Our analysis has also shown another positive quarter for the MSCI World ETF over the futures, with potential annualized saving of 12bps for the last quarter and of 18bps averaging the past 4 quarterly rolls (1 year) for a potential ETF investor.

FTSE 100 Futures Roll

After a cheaper roll in Q2 '21, the FTSE 100 Index Futures cost rebounded in Q3, returning in line with other rolls we witnessed in recent quarters. Despite not always being the cheapest options, the ETF cost predictability over time, make it a valuable alternative to some investors.

For long-term investors, ETFs make more sense

Futures prices are driven by supply and demand. When market sentiment is positive, there's more demand from long investors, which drives futures costs up (and vice versa). This can be seen on both our CFTC commitment of traders charts.

ETF costs are more predictable than this as you will see below and throughout the further analysis in this document. They might not be cheaper on every index and in every quarter when comparing against the futures, but the costs are trending downwards and are more consistent.

Data: Invesco.

Q3 savings for an Invesco ETF investor

Index	ETF cost	Futures cost	Saving
S&P 500	5	43	38
MSCI World	26	38	12
FTSE 100	24	75	51
MSCI Emerging Markets	29	28	-1
MSCI Europe	28	-8	-37
STOXX Europe 600	52	10	-42
Euro Stoxx 50	40	-10	-50

Data: Invesco/Bloomberg, September 2021. Costs and savings are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index. **Past performance is not a reliable indicator of future returns.**



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How we compare ETFs and futures

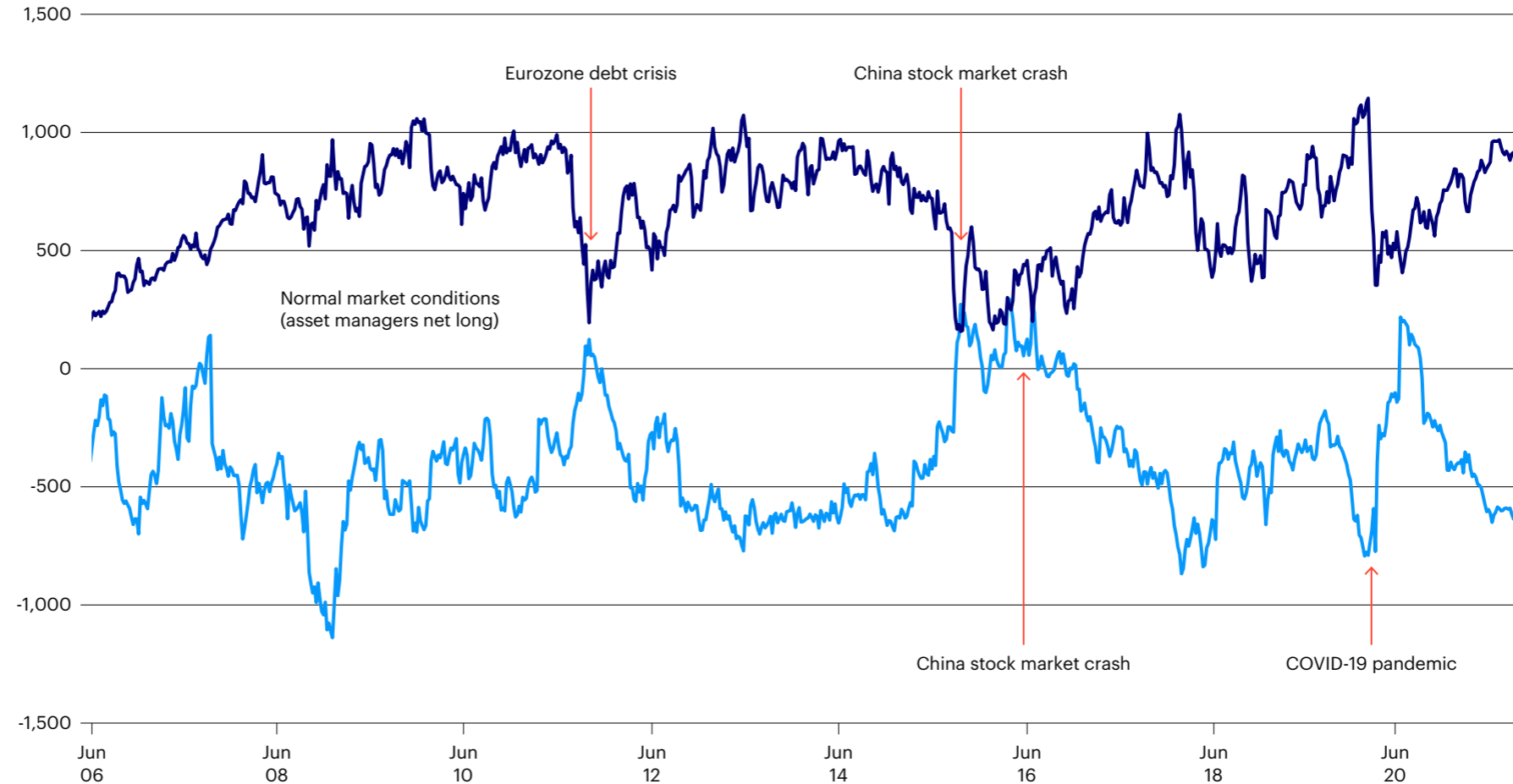
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The current situation

CFTC's Commitments of Traders – S&P E-MINI

- Asset managers net position
- Dealers net position

Net position (thousands)



Data: CFTC's Commitment of Traders, September 2021.



The current situation

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How we compare ETFs and futures

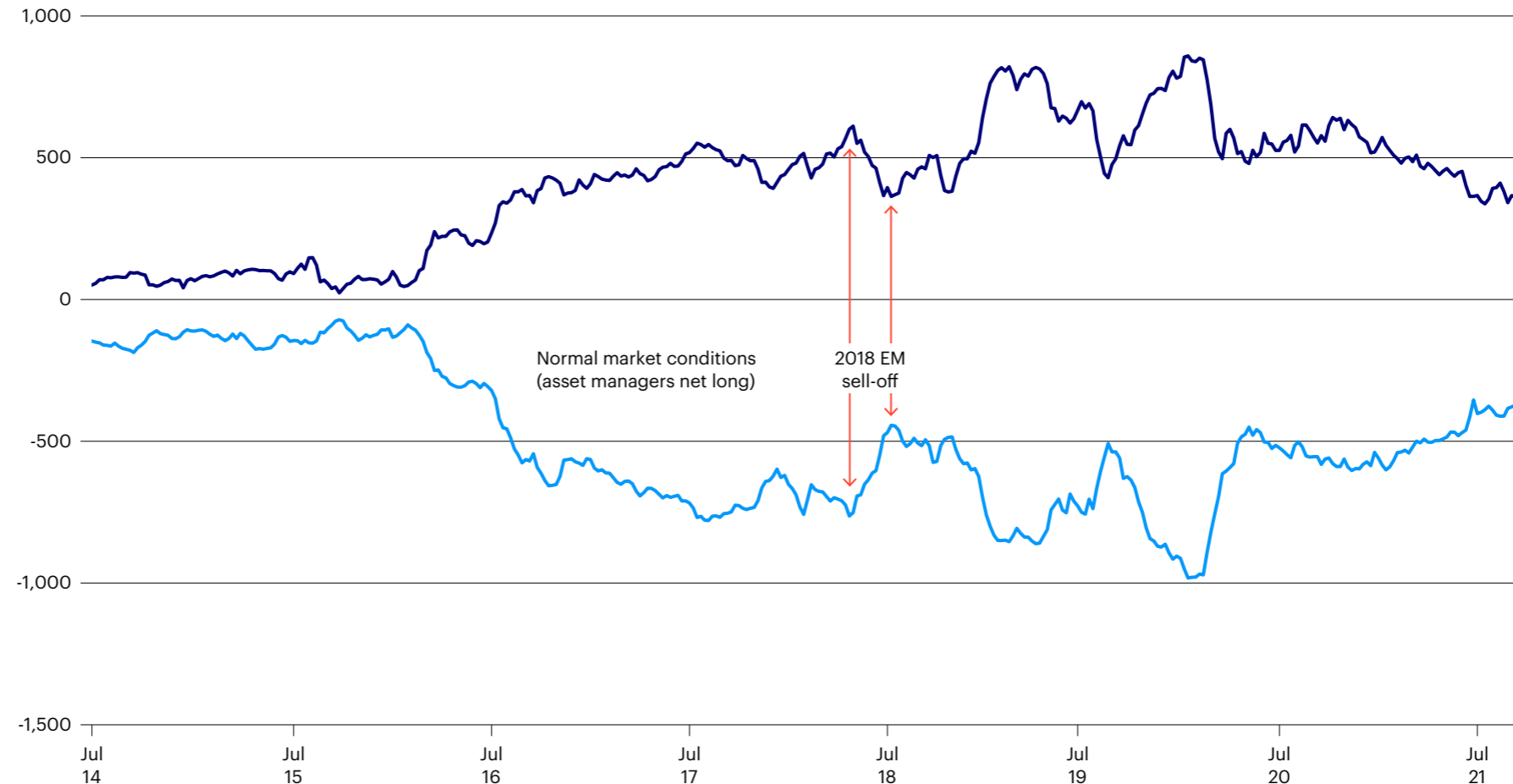
- The basics
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The current situation

CFTC's Commitments of Traders – MSCI EM-MINI

- Asset managers net position
- Dealers net position

Thousands



Data: CFTC's Commitment of Traders, September 2021.



The current situation

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S&P 500

Historical savings for Invesco ETF investor*

	ETF cost*	Futures cost	Saving*
Q3 2021	5	43	38
1 year	5	49	43
3 years	8	48	41
5 years	15	54	39

Values are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index.

Invesco ETF

Name	Invesco S&P 500 UCITS ETF Acc
ISIN	IE00B3YCGJ38
Ongoing charge ¹	0.05%
Swap fee ¹	0.00%

¹ Annual fees. Ongoing charge includes management fee, custody and administration costs, but excludes transaction costs such as swap fee.

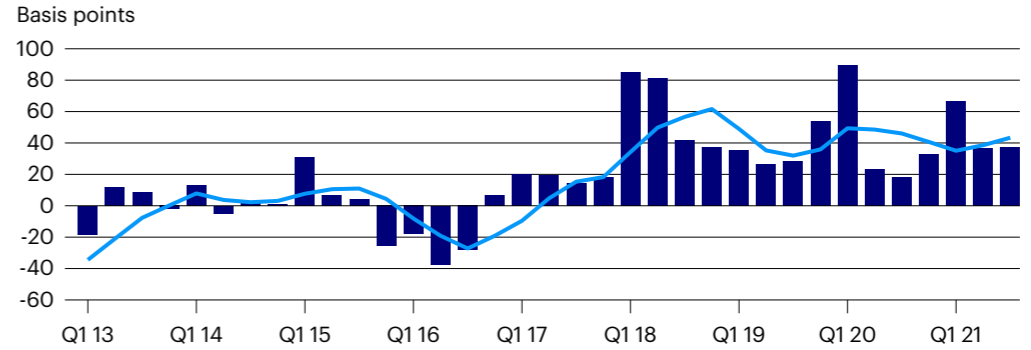
Futures contract

Name	E-mini S&P 500 Futures
Exchange	CME
Cash rate	ICE LIBOR USD Overnight
Roll period	Between 9 and 1 weekdays before expiry

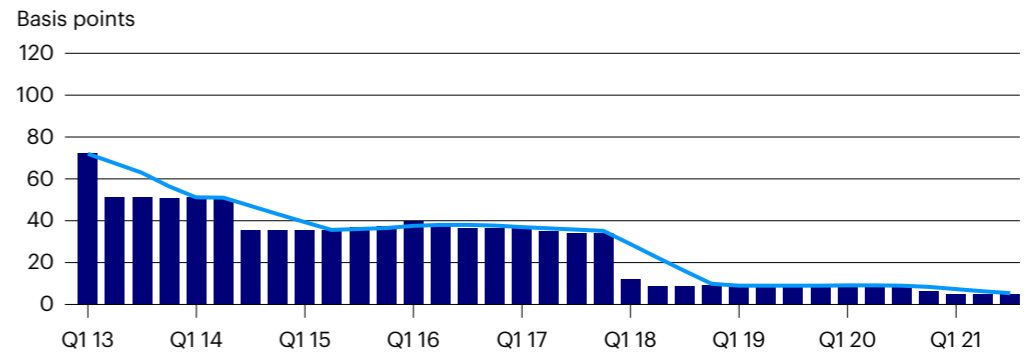
Cost calculations are based on returns vs the S&P 500 Total (Gross) Return Index. Please see "[How we compare ETFs and futures](#)" on page 13 for further information. ETF costs may differ from stated annual fees due to the effect of dividend withholding tax.

■ Annualised cost
■ 12m average

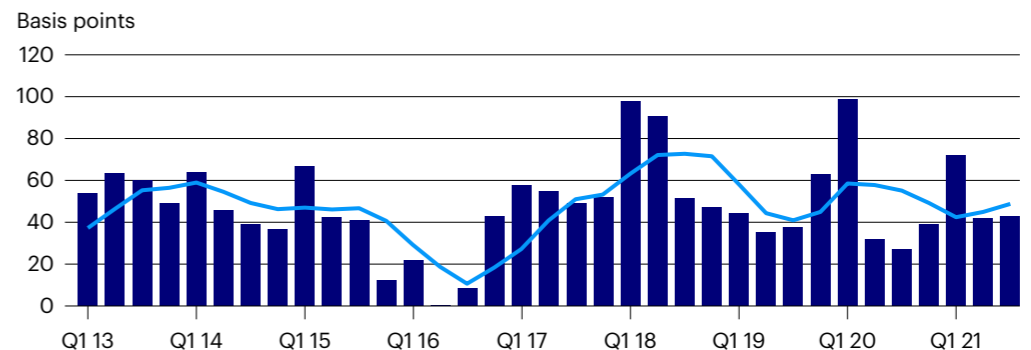
Quarterly savings for Invesco ETF investor*



Quarterly Invesco ETF cost



Quarterly futures cost



Data: Invesco, Bloomberg as of September 2021. **Past performance is not indicative of future returns.** *ETF costs used in savings chart and table are based on simulated ETF data. In these the performance prior to June 2014 is simulated to reflect current fund economics.



The current situation

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MSCI World

Historical savings for Invesco ETF investor*

	ETF cost*	Futures cost	Saving*
Q3 2021	26	38	12
1 year	33	51	18
3 years	36	57	21
5 years	42	64	22

Values are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index.

Invesco ETF

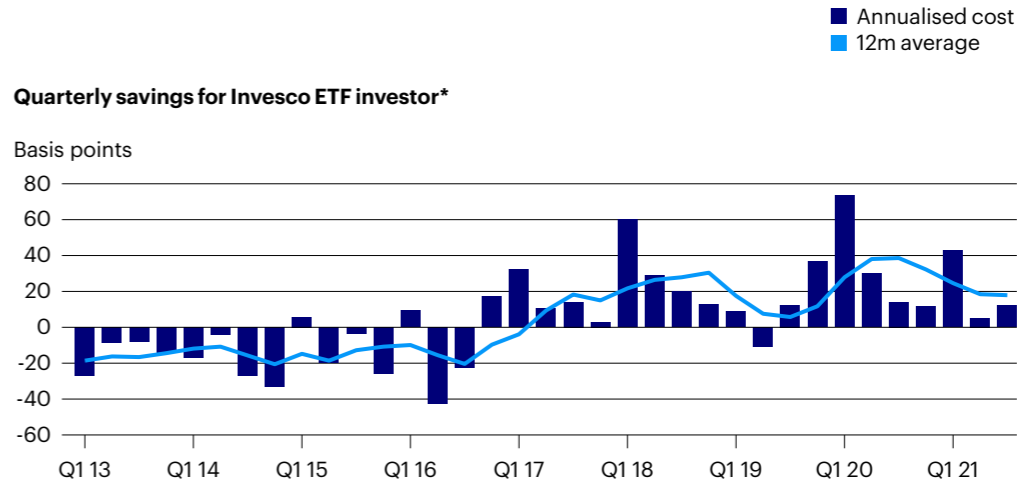
Name	Invesco MSCI World UCITS ETF
ISIN	IE00B60SX394
Ongoing charge ¹	0.19%
Swap fee ¹	0.00%

¹ Annual fees. Ongoing charge includes management fee, custody and administration costs, but excludes transaction costs such as swap fee.

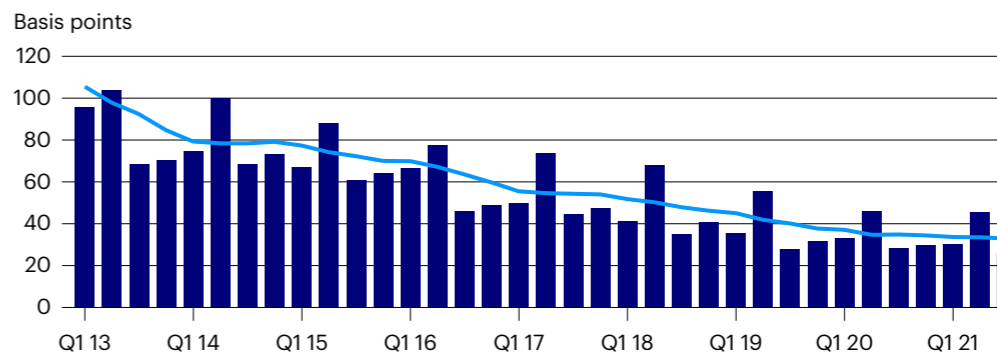
Futures contract

Name	MSCI World Net Total Return Index Futures
Exchange	ICE
Cash rate	ICE LIBOR USD Overnight
Roll period	Between 4 and 1 weekdays before expiry

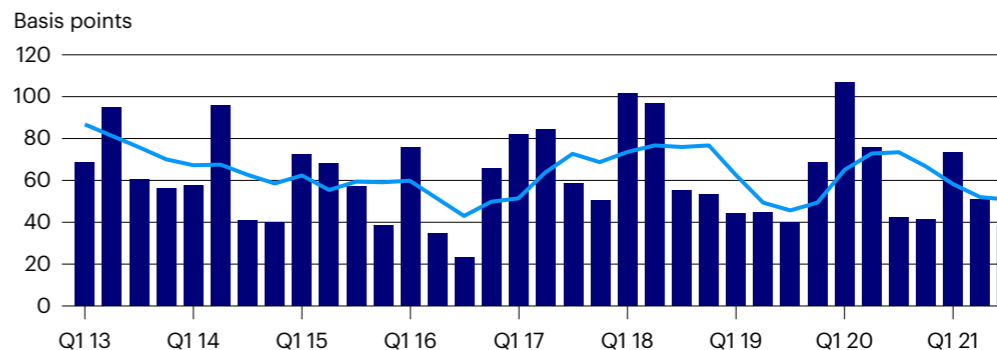
Cost calculations are based on returns vs the MSCI World Gross Return Index. Please see "[How we compare ETFs and futures](#)" on page 13 for further information. ETF costs may differ from stated annual fees due to the effect of dividend withholding tax.



Quarterly Invesco ETF cost



Quarterly futures cost



Data: Invesco, Bloomberg as of September 2021. **Past performance is not indicative of future returns.** *ETF costs used in savings chart and table are based on simulated ETF data. In these the performance prior to February 2016 is simulated to reflect current fund economics.



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FTSE 100

Historical savings for Invesco ETF investor*

	ETF cost*	Futures cost	Saving*
Q3 2021	24	75	51
1 year	24	61	37
3 years	28	50	21
5 years	31	43	12

Values are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index.

Invesco ETF

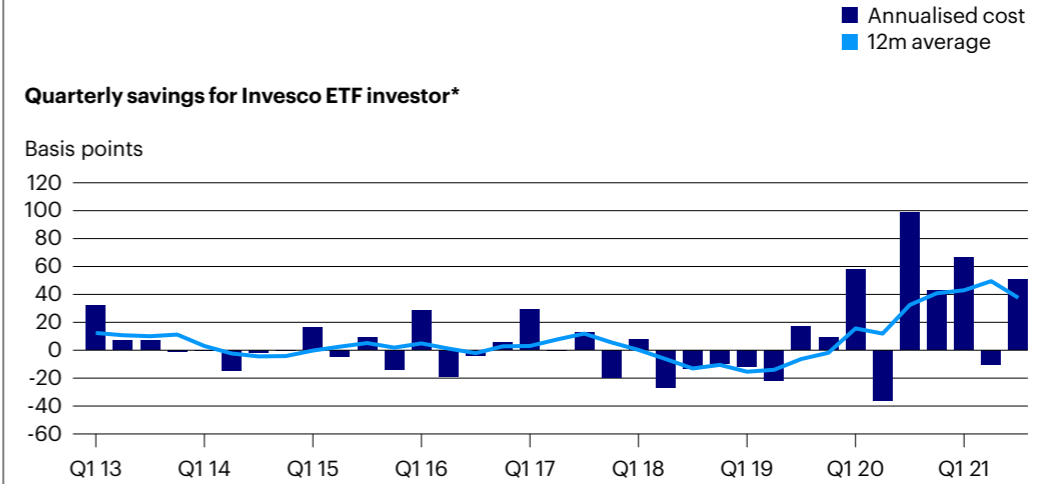
Name	Invesco FTSE 100 UCITS ETF
ISIN	IE00B60SWT88
Ongoing charge ¹	0.09%
Swap fee ¹	0.15%

¹ Annual fees. Ongoing charge includes management fee, custody and administration costs, but excludes transaction costs such as swap fee.

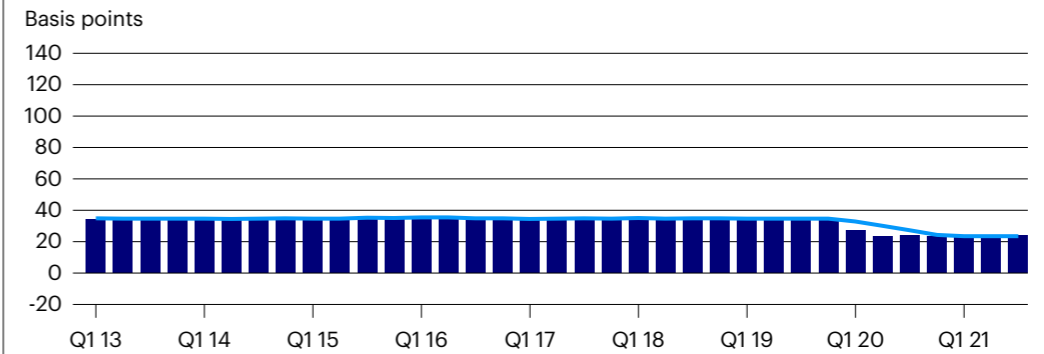
Futures contract

Name	FTSE 100 Index Futures
Exchange	ICE
Cash rate	ICE LIBOR GBP Overnight
Roll period	Between 4 and 1 weekdays before expiry

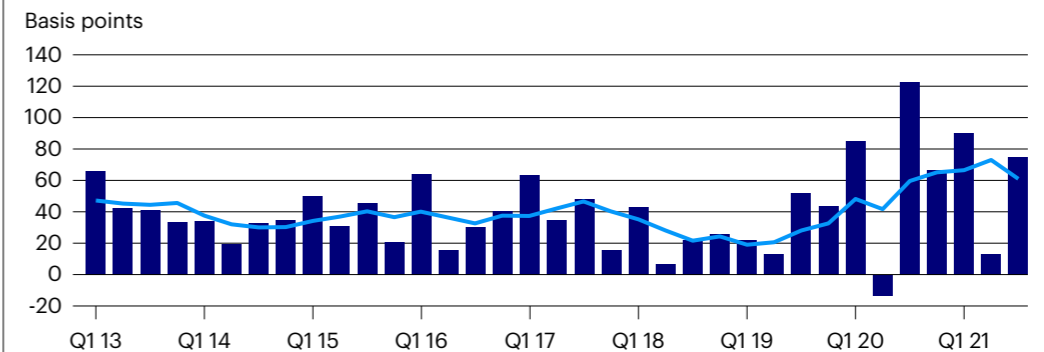
Cost calculations are based on returns vs the FTSE 100 Total Return Index. Please see "[How we compare ETFs and futures](#)" on page 13 for further information. ETF costs may differ from stated annual fees due to the effect of dividend withholding tax.



Quarterly Invesco ETF cost



Quarterly futures cost



Data: Invesco, Bloomberg as of September 2021. Past performance is not indicative of future returns.



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MSCI Emerging Markets

Historical savings for Invesco ETF investor*

	ETF cost*	Futures cost	Saving*
Q3 2021	29	28	-1
1 year	40	34	-6
3 years	49	45	-4
5 years	51	62	11

Values are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index.

Invesco ETF

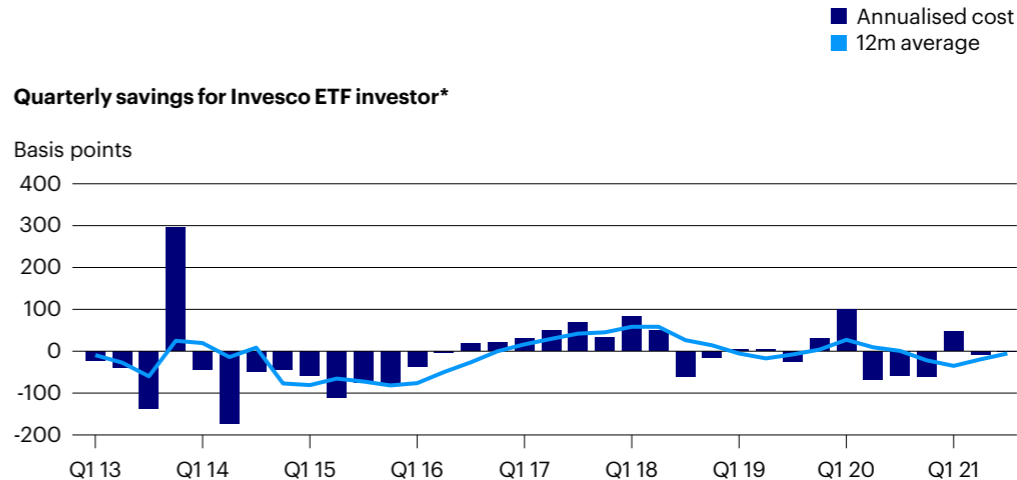
Name	Invesco MSCI Emerging Markets UCITS ETF
ISIN	IE00B3DWVS88
Ongoing charge ¹	0.19%
Swap fee ¹	0.10%

¹ Annual fees. Ongoing charge includes management fee, custody and administration costs, but excludes transaction costs such as swap fee.

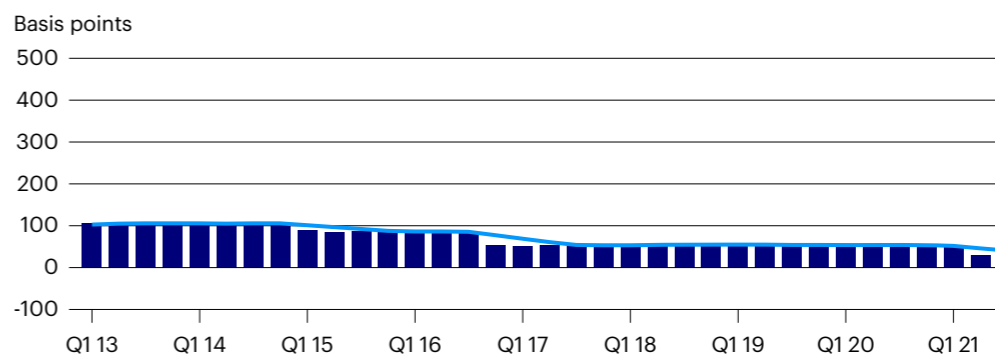
Futures contract

Name	mini MSCI Emerging Markets (EM) Index Futures
Exchange	ICE
Cash rate	ICE LIBOR USD Overnight
Roll period	Between 4 and 1 weekdays before expiry

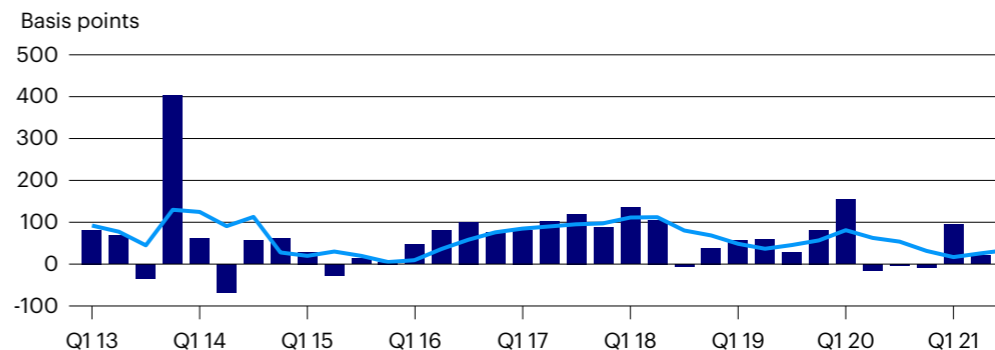
Cost calculations are based on returns vs the MSCI Emerging Markets Net Return Index. Please see "[How we compare ETFs and futures](#)" on page 13 for further information. ETF costs may differ from stated annual fees due to the effect of dividend withholding tax.



Quarterly Invesco ETF cost



Quarterly futures cost



Data: Invesco, Bloomberg as of September 2021. **Past performance is not indicative of future returns.** *ETF costs used in savings chart and table are based on simulated ETF data. In these the performance prior to October 2016 is simulated to reflect current fund economics.



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MSCI Europe

Historical savings for Invesco ETF investor*

	ETF cost*	Futures cost	Saving*
Q3 2021	28	-8	-37
1 year	44	23	-21
3 years	46	15	-31
5 years	49	20	-29

Values are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index.

Invesco ETF

Name	Invesco MSCI Europe UCITS ETF
ISIN	IE00B60SWY32
Ongoing charge ¹	0.19%
Swap fee ¹	0.00%

¹ Annual fees. Ongoing charge includes management fee, custody and administration costs, but excludes transaction costs such as swap fee.

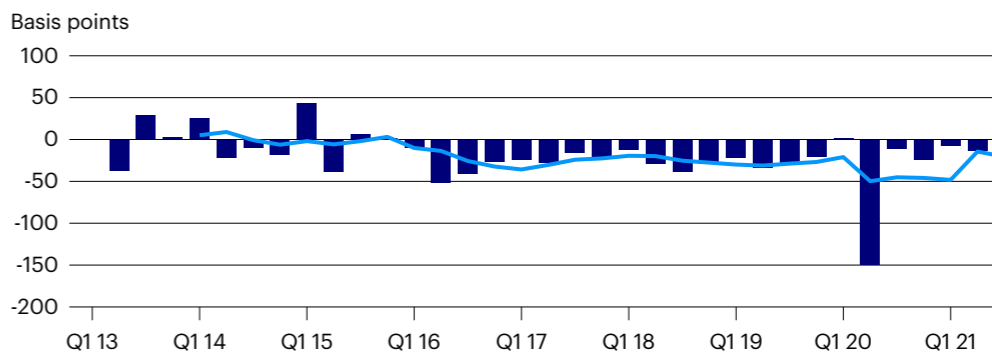
Futures contract

Name	MSCI Europe Index Futures
Exchange	Eurex
Cash rate	Euro OverNight Index Average (EONIA)
Roll period	Between 4 and 1 weekdays before expiry

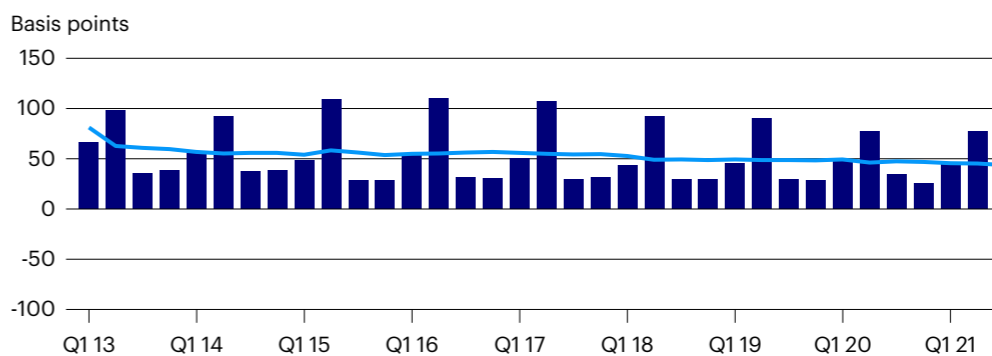
Cost calculations are based on returns vs the MSCI Europe Gross Return Index. Please see "[How we compare ETFs and futures](#)" on page 13 for further information. ETF costs may differ from stated annual fees due to the effect of dividend withholding tax.

■ Annualised cost
■ 12m average

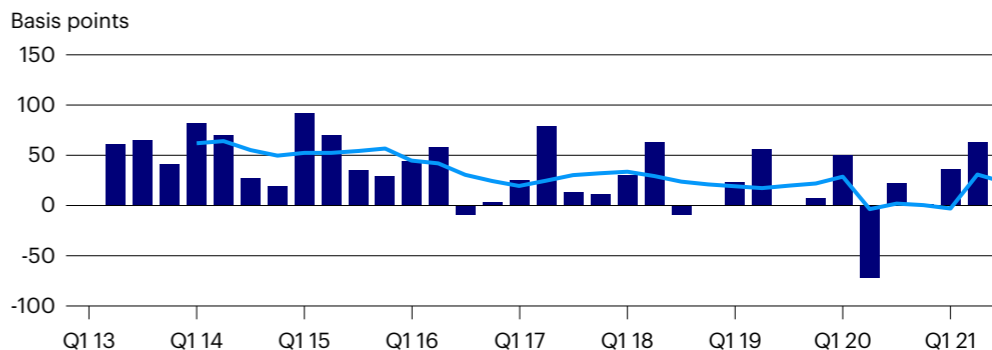
Quarterly savings for Invesco ETF investor*



Quarterly Invesco ETF cost



Quarterly futures cost



Data: Invesco, Bloomberg as of September 2021. Past performance is not indicative of future returns.



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STOXX Europe 600

Historical savings for Invesco ETF investor*

	ETF cost*	Futures cost	Saving*
Q3 2021	52	10	-42
1 year	52	32	-21
3 years	50	1	-49
5 years	49	10	-39

Values are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index.

Invesco ETF

Name	Invesco STOXX Europe 600 UCITS ETF
ISIN	IE00B60SWW18
Ongoing charge ¹	0.19%
Swap fee ¹	0.00%

¹ Annual fees. Ongoing charge includes management fee, custody and administration costs, but excludes transaction costs such as swap fee.

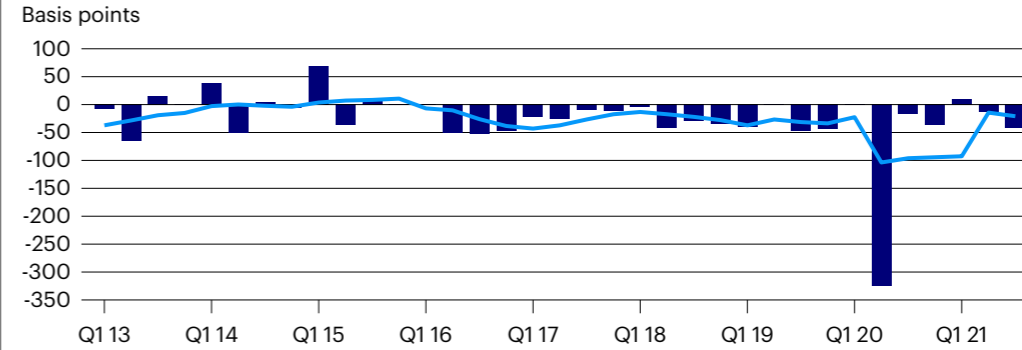
Futures contract

Name	STOXX® Europe 600 Index Futures
Exchange	Eurex
Cash rate	Euro OverNight Index Average (EONIA)
Roll period	Between 4 and 1 weekdays before expiry

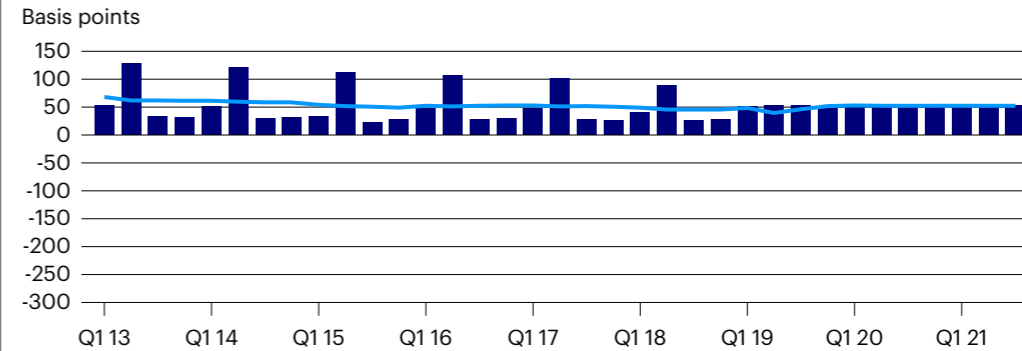
Cost calculations are based on returns vs the STOXX Europe 600 Gross Return Index. Please see "[How we compare ETFs and futures](#)" on page 13 for further information. ETF costs may differ from stated annual fees due to the effect of dividend withholding tax.

■ Annualised cost
■ 12m average

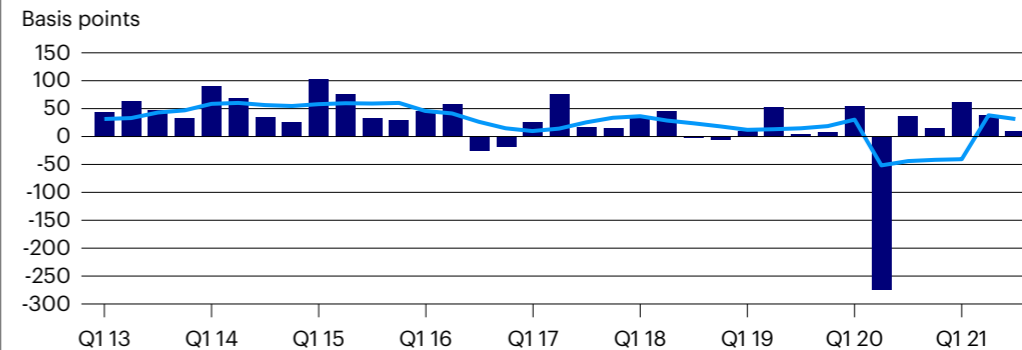
Quarterly savings for Invesco ETF investor*



Quarterly Invesco ETF cost



Quarterly futures cost



Data: Invesco, Bloomberg as of September 2021. Past performance is not indicative of future returns.



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Euro Stoxx 50

Historical savings for Invesco ETF investor*

	ETF cost*	Futures cost	Saving*
Q3 2021	40	-10	-50
1 year	39	10	-30
3 years	38	-17	-55
5 years	38	4	-35

Values are in basis points, annualised. Negative costs occur when the ETF or future outperforms the index.

Invesco ETF

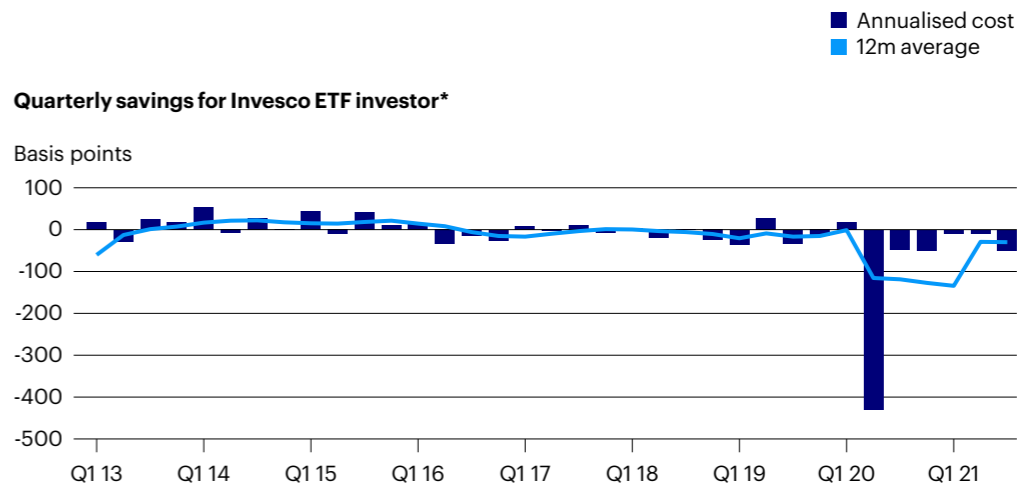
Name	Invesco EURO STOXX 50 UCITS ETF Acc
ISIN	IE00B60SWX25
Ongoing charge ¹	0.05%
Swap fee ¹	0.00%

¹ Annual fees. Ongoing charge includes management fee, custody and administration costs, but excludes transaction costs such as swap fee.

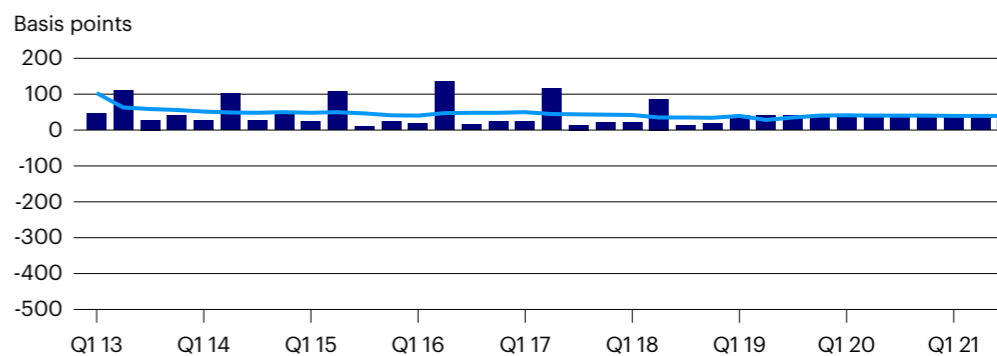
Futures contract

Name	EURO STOXX 50® Index Futures
Exchange	Eurex
Cash rate	Euro OverNight Index Average (EONIA)
Roll period	Between 4 and 1 weekdays before expiry

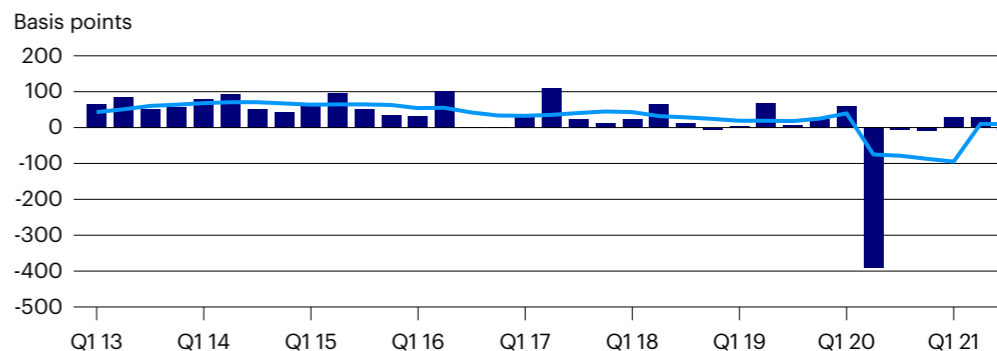
Cost calculations are based on returns vs the EURO STOXX 50 Gross Return Index. Please see "[How we compare ETFs and futures](#)" on page 13 for further information. ETF costs may differ from stated annual fees due to the effect of dividend withholding tax.



Quarterly Invesco ETF cost



Quarterly futures cost



Data: Invesco, Bloomberg as of September 2021. **Past performance is not indicative of future returns.**

How we compare ETFs and futures



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The basics

Both exchange-traded funds (ETFs) and futures can give you liquid and cost-effective index exposure, but there are important differences between them.



ETFs

An ETF is an open-ended fund, in which investors purchase shares and pay an ongoing management fee.

Most Europe-listed ETFs are UCITS funds.



Futures

A future is a short-term listed derivative contract that provides a specified return to the buyer, but must be rolled regularly (selling the expiring contract and entering into a new one).

	UCITSETF	Futures
Legal structure	UCITS fund	Listed derivative contract
Funding requirement	100%	Margin
Investment performance	Typically target net total return, less fees	Typically price return (plus market expectations of dividends, incorporated in futures price)
Tracking error	Varies depending on ETF structure (effectively zero for many of Invesco' swap-enhanced ETFs)	Effectively zero
Trading	On exchange or over-the-counter (OTC)	On exchange or OTC
Trading costs	Commission and bid-offer spread (or create-redeem fees) on entry and exit	Commission and bid-offer spread on entry and exit (4x per annum for quarterly expiring futures)
Holding costs	Ongoing charges (management, custody, administration), plus swap fees where relevant	Roll cost (difference between cost of expiring contract and new contract). This can be positive (a "roll yield")
Operational requirements	Similar to ordinary shares	Management of margin requirements, regular rolling of contracts



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ETFs

- S&P 500
- MSCI World
- FTSE 100
- MSCI Emerging Markets
- MSCI Europe
- STOXX Europe 600
- Euro Stoxx 50

How we compare ETFs and futures

- The basics
- **The cost of index exposure**
- What our analysis doesn't consider

The cost of index exposure

As we have seen, there are many practical and operational differences between ETFs and futures. Some of these depend on the circumstances and preferences of the individual investor.

As a result, it is impossible to compare the "cost" of index exposure across the whole investment process without making extensive assumptions.

Our analysis focuses on performance and holding cost only. By leaving trading costs and margin requirements to one side, it is possible to make a more meaningful comparison. The total return of an index, with dividends re-invested, is a useful benchmark for comparison. We therefore aim to answer this question:

What does it cost to maintain index performance, on a total return basis?

Our analysis takes a practical rather than a theoretical approach. Rather than looking in detail at what drives futures and ETF prices and whether they are "fairly valued", we look instead at what return each has delivered in practice, and how this compares to our target total return. The difference is the "cost".

Our assumptions

- Investors are fully funded
- The futures investor earns a yield on their cash
- Margin and trading costs are excluded

Costs for an ETF investor

An ETF typically aims to deliver the total return of a specified index, less fees and any withholding tax on dividends. So, in theory, we expect the cost of our index exposure to equal the fee plus withholding taxes. In practice, however, there are many factors that can cause the ETF to diverge from its objective, for example: how it replicates the index, how efficiently it reinvests dividends, what level of withholding tax reinvested dividends are subject to and any stock lending revenue.

The simplest way to assess the "real cost" of holding is to measure the ETFs actual performance, based on its net asset value and any distributions it makes, and compare this to the total return of the index.

$$\text{ETF cost} = \text{Index total return} - \text{ETF return (change in NAV + distributions)}$$

Costs for a futures investor

Calculating the cost of index performance for a futures investor is slightly more complex. A futures contract generally delivers the price return of the index. However, investors need to roll contracts (typically quarterly), and the difference in price between the expiring and the new contract (roll yield, or roll cost if negative) is an important component of their return.

What drives the roll yield? The price of futures depends on both interest rates (what does it cost the seller to borrow the funds necessary to hedge their exposure) and market expectations of dividends (to compensate investors for not receiving dividends via the contract). As a result, the roll yield typically reflects a) current funding levels and b) market expectations for dividends for the next quarter. High expected dividends drive futures prices lower (and the roll yield higher). High interest rates drive futures prices higher (and the roll yield lower or negative).

So, what is the cost of our total return exposure? We need to compare our target total return performance with the price return delivered by the contracts, plus the roll yield. To make a like-for-like comparison with the ETF, we also need to assume that the futures investor is fully funded and earns interest on their cash.

$$\text{Futures cost} = \text{Index total return} - \text{Futures return (Index price return + roll yield)} - \text{Cash yield}$$

Since the total return of an index is equal to the price return plus dividends, we can simplify this as follows:

$$\text{Futures cost} = \text{Dividends} - \text{Roll yield} - \text{Cash yield}$$



The current situation

- CFTC's Commitments of Traders – S&P E-MINI
- CFTC's Commitments of Traders – MSCI EM-MINI

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What our analysis doesn't consider

Invesco' analysis considers only holding costs. Although they are more difficult to quantify, there are of course many other factors that might impact an investor's decision, for example:



Trading costs

These vary depending on the investor and the broker. The competition in ETF trading is currently high, so trading costs for widely-traded ETFs are not significantly higher than for futures. For futures, commissions/bid-offer spreads are typically payable four times a year and may vary depending on the exact roll date(s).



Liquidity

Trading volumes in some index futures can be very high. However, for ETFs, which are open-ended instruments, liquidity is determined more by the underlying market than by volume in the ETF itself. For most investors looking for exposure to widely-traded indices, liquidity should not be a deciding factor. In some less widely-traded markets, it may be a consideration.



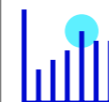
Cash yields, margin and custodian fees

We assume that futures investors earn a market interest rate on their cash. However, the rate that investors achieve in practice may vary. Custodians take a mark-up on long cash positions, and margin requirements may also reduce yields slightly.



Convenience

For some investors, it may be more convenient to own a UCITS fund than to take listed derivatives exposure. ETFs may be viewed as having a lower operational burden because there is no need to roll or make decisions about when to roll.



Do interest rates matter?

There are several misconceptions relating to interest rates and the ETFs vs futures debate. One suggestion is that ETFs make more sense when rates are low, as the yield that you could have earned on your cash balance is lower. Another is that futures are cheaper when rates are lower.

In practice, neither argument really stands up. It's true that futures prices are impacted by changes in interest rate: when rates fall, futures prices typically fall too (and vice versa). However, when rates fall, the yield that futures investors earn on their cash also falls (and vice versa). So the net impact of changes in interest rates is minimal.

What's the conclusion? Your individual circumstances (e.g. the yield you can earn on cash relative to market benchmarks) might affect your decision on whether to use ETFs or futures, but the general outlook for interest rates shouldn't be a major consideration.

Investment Risks

Value fluctuation: The value of investments and any income will fluctuate (this may partly be the result of exchange rate fluctuations) and investors may not get back the full amount invested.

Counterparty risk: Other financial institutions provide services such as safekeeping of assets or as a counterparty to financial contracts such as derivatives. The Fund is exposed to the risk of bankruptcy, or any other type of default of the counterparty related to any trading transaction entered into by the Fund.

Risk of using derivatives: In order to reach its investment objective, the Fund enters into swap agreements which provide the performance of the Reference Index, and may imply a range of risks which could lead to an adjustment or even the early termination of the swap agreement.

Liquidity on secondary market risk: Lower liquidity means there are insufficient buyers or sellers to allow the Fund to sell or buy investments readily. On-exchange liquidity may be limited due to insufficient demand, Reference Index suspension, a decision by one of the relevant stock exchanges, or a breach by the market maker of respective stock exchange requirements and guidelines. This may result in share prices that differ significantly from the NAV.

As the Invesco MSCI Emerging Markets UCITS ETF is an emerging markets ETF and is invested in less developed countries, investors should be prepared to accept a higher degree of risk than for an ETF investing in the securities of issuers in other more established economies or developed countries, as difficulties in dealing, settlement and custody could arise.

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Data as at 17 September 2021 unless otherwise stated.

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