Xtrackers

THE MECHANICS OF CURRENCY HEDGING
THINK ACCESS. THINK X.

Contents

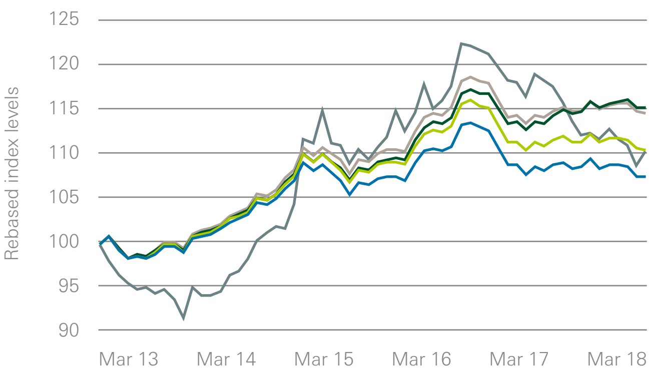
This document intends to provide an overview as to why and how an investor can hedge currency exposure within an investment portfolio. It covers the impact and costs associated with currency hedging and how this can effect overall portfolio total return, describes the most common methods of currency hedging, outlines Xtrackers' dynamic hedging methodology and finally, provides a case study comparing different ways of hedging currency risk. For those seeking more detailed information on currency hedging or Xtrackers ETFs, please contact Xtrackers via xtrackers@dws.com or speak to one of our specialists.

Overview of currency hedging

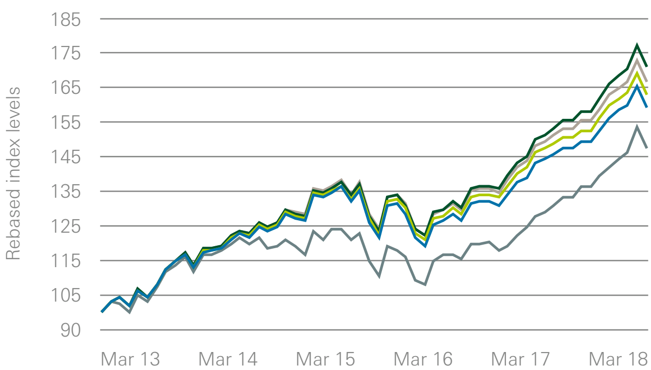
Currency hedging is the process of mitigating foreign exchange risk within a portfolio. A currency hedged direct replication Xtrackers ETF would give exposure to a portfolio of securities plus currency forwards, the latter hedging every security currency in the portfolio into the target (hedged) currency.

Both single and multi-currency portfolios typically have lower volatility when the currency risk has been mitigated, particularly for fixed income exposures. For example, over the past 5 years, the Citi WGBI Developed Markets currency hedged indices exhibited a volatility less than half that of the unhedged index. For the MSCI World Index, when currency hedging over 5 years, volatility also fell for every target currency. (Graphs 1, 2 and table 1).

GRAPH 1:
Performance of Citi WGBI Developed Markets Index
Unhedged in EUR vs. currency hedged indices



GRAPH 2:
Performance of MSCI World Index
Unhedged in USD vs. currency hedged indices



Unhedged | GBP hedged | USD hedged | EUR hedged | CHF hedged

Source for both graphs: Deutsche Asset Management (UK) Limited (DWS) as of 28/02/2018. Past performance is not a reliable indicator of future returns.

TABLE 1:
5 year performance, unhedged vs. hedged indices

5 year (28/02/13–28/02/18)	Citi WGBI Developed Markets Index		MSCI World Index	
	Total return	Volatility*	Total return	Volatility*
Unhedged	11.8%	6.09%	50.7%	10.05%
GBP hedged	15.3%	3.02%	71.3%	9.20%
USD hedged	15.9%	2.93%	76.0%	9.19%
EUR hedged	11.3%	3.02%	67.7%	9.18%
CHF hedged	8.2%	3.01%	63.9%	9.25%

*Annualised volatility based on 5Y monthly returns.

Source: Deutsche Asset Management (UK) Limited (DWS) as of 28/02/2018. Past performance is not a reliable indicator of future returns.

How is currency hedging implemented?

One common method of currency hedging is via a foreign exchange (FX) forward contract. The hedge is implemented by entering into forward currency contracts (selling asset currency/buying target currency). The FX forward locks in an exchange rate today at which the currency transaction will occur at a future date, thereby mitigating currency risk during that month. Typically one-month FX forwards are used.

For ETFs, the currency risk inherent in the benchmark index exposure would determine what needs to be hedged. For example, a EUR-based investor buying US dollar corporate bonds is exposed to fluctuations in the EUR/USD currency pair. By entering into a one-month EUR/USD forward contract the investor locks in today's currency forward rate for one month, mitigating the currency risk stemming from the US dollar corporate bond exposure for that month. In the case of a multi-currency portfolio, each currency pair needs to be hedged with individual FX forward contracts to mitigate currency exposure. For example, to hedge Xtrackers II Global Government Bond UCITS ETF into EUR, an investor would take each currency in the unhedged index (excluding EUR) and enter into an FX forward for each currency pair to EUR.*

* This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation.

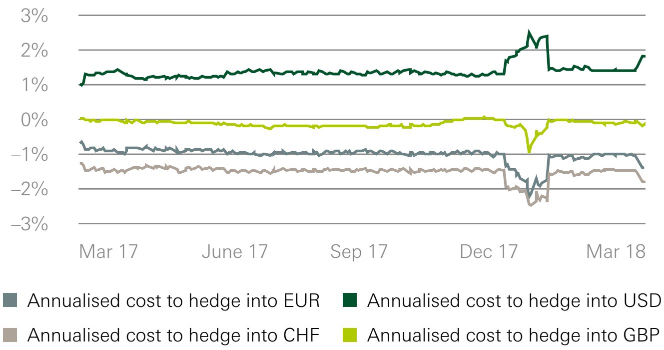
What impacts the total return of a currency hedged exposure?

There are two main components that make up the total return of a currency hedged portfolio; the performance of the unhedged portfolio in the currency of the underlying asset and the forward currency contracts return (or the impact of currency hedging).

The forward currency contract's return will be impacted mainly by transaction costs and interest rate differentials priced into the forward contracts. These two factors are also often described as the cost of currency hedging. Of those factors, the interest rate differential is typically the much larger contributor. For example, when investing in a currency hedged share class of Xtrackers II Global Government Bond UCITS ETF, each currency is hedged back to the hedging currency. Graph 3 shows the historical cost of hedging the Xtrackers II Global Government Bond UCITS ETF back into EUR, USD, CHF and GBP. For example as of 28 February 2018, it costs around 1.2% to hedge Xtrackers II Global Government Bond UCITS ETF into EUR. Note, for some currency pairs the interest rate differential is a cost, but in the case of others it is a benefit.*

This dynamic is primarily being driven by the interest rate differential between USD and EUR/CHF/GBP. As interest rates are currently much higher in the US than in most of developed Europe, there is increased demand for USD assets hedged back to developed European currencies. Banks will price FX forwards according to supply and demand as well as their cost to hold or hedge currency exposure. When providing a USD to EUR hedge, a bank goes long the EUR (because it will need to deliver EUR at the maturity of the forward contract), thus earning EUR interest rates, which are currently negative. Also the bank shorts USD, thus having to pay the higher USD interest rates. The bank will price this interest rate differential into the price of the FX forward.

GRAPH 3:
Historical annualised hedging costs for Xtrackers II Global Government Bond UCITS ETF



Source: Deutsche Asset Management (UK) Limited (DWS), Bloomberg as of 28/02/2018. Past performance is not indicative of future returns. Annualised cost to hedge computed with historical one-month FX forward rates, implied FX forward rates are based on short-term interest rate differentials (Estimation based on the hedging of USD, EUR, CHF, JPY, AUD and CAD). Note: A negative value indicates a cost/detractor from performance.

Is a currency hedged exposure always perfectly hedged into the target currency?

When hedging currency risk for a portfolio of securities, the amount of each FX forward position is determined by the notional value of the portfolio on the day of rebalance. At this point the "hedge ratio" is 100%, as the total value of the investment is hedged. However, intra month the value of the underlying securities in the portfolio may vary and cause the hedge ratio to deviate from 100%. If the value of the portfolio of securities:

DECREASES the hedge ratio will exceed 100% and the position will be over hedged.

INCREASES the hedge ratio will drop below 100% and the position will be under hedged

When the hedge ratio does not equal 100% the position is known as an imperfect hedge. Note that in practise, even when daily hedging currency exposure, it is almost impossible to maintain a 'perfect hedge' due to intraday movements in the price of underlying assets and currency pairs.

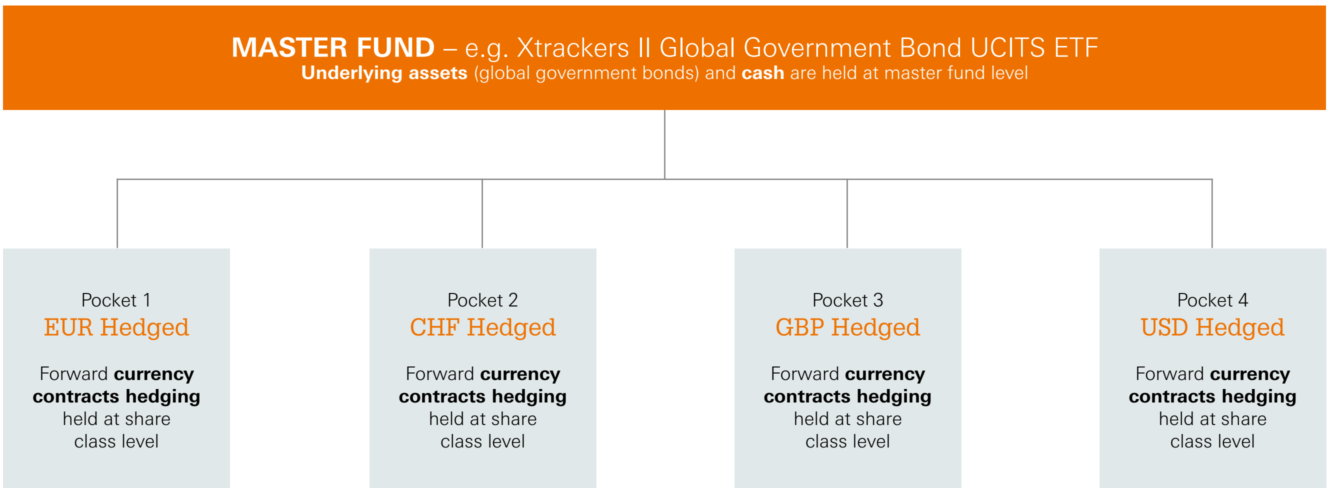
How is currency hedging implemented in a share class structure for Xtrackers ETFs?

ETFs set up under a share class structure will have one common pool of assets. For direct replication ETFs, this common pool holds the underlying securities used to track the benchmark index and is typically an unhedged exposure.

Other share classes of the fund may offer currency hedging. Any FX forward contracts used to gain this exposure will be booked at the share class level to ensure segregation between all share classes of the fund. Allocation ratios allow for the accurate allocation of the common pool of assets across different hedged share classes and ensure there is no dilution between share classes (table 2).

An investment in a currency hedged share class is equal to a slice of the common pool plus the FX forward contracts relating to that share class.

TABLE 2:
Direct replication currency hedged share class structure



Source: Deutsche Asset Management (UK) Limited (DWS) as of February 2018.

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Currency hedging methodologies

Historically, the most common approach to currency hedging share classes of ETFs and indices is a monthly static hedge approach. This implies the FX hedge is rebalanced at each month end (which, in the case of an ETF tracking a monthly rebalanced index, is at the same time as underlying index rebalancing), regardless of currency or asset price movements intra-month.

In 2017 ESMA announced new guidelines in Europe around UCITS currency hedged share classes specifically aimed at reducing the risk that one share class performance will impact another share class of the same fund. These regulatory changes need to be implemented by 30 July 2018. Guidelines stipulate that the hedge ratio of any currency hedged share class must not exceed 105% or fall short of 95% of the asset value of the share class. Thus, ETF providers must monitor hedge ratios for currency hedged share classes within these tolerances (95%-105%) to ensure there is no breach of ESMA guidelines.

Following the publication of this ESMA opinion, a new model, the 'dynamic hedge' is now increasingly introduced. Table 3 compares commonly used currency hedging methodologies.

TABLE 3:
Commonly used currency hedging methodologies

	Static monthly hedge	Static daily hedge	Dynamic hedge
Instrument used		1 month FX forward contracts	
Hedge reset frequency	Monthly, typically at month end to coincide with portfolio rebalance	Daily, typically at end of day	Whenever hedge ratio thresholds are breached (ESMA requires 95%-105% threshold but some providers may use tighter internal thresholds)
Benefits	_ Lower transaction costs as the hedge is only reset once a month _ Common method of currency hedging, used by many index providers making performance monitoring versus the index easier	_ Lower risk of an imperfect hedge (i.e. unwanted currency risk) intra-month as the forward contract is reset daily _ Many index providers offer daily hedged indices making performance monitoring versus the index easier	Combines benefits of monthly and daily static hedging: _ Hedge is reset if currency or asset price moves lead to the hedge ratio falling outside of tolerances. This mitigates intra-month currency risk from imperfect hedging whilst reducing transaction costs vs. static daily hedging
Disadvantages	Intra-month, the hedge ratio will not reset with currency or asset price moves, this could make the hedge imperfect, potentially causing unwanted currency risk	_ Typically incurs higher transaction costs vs. monthly/dynamic methods, removing the benefit of daily resetting _ Higher operational costs when used for direct replication funds	Currently index providers do not publish an index which accounts for a dynamic hedge approach
Xtrackers approach	Xtrackers' 'old model' for direct replication ETFs. Xtrackers indirect replication (swap-based) ETFs continue to use a monthly static approach to currency hedging via a currency hedged index swap.		Xtrackers new model for direct replication ETFs

This regulation has prompted Xtrackers to review the currency hedging approach and implement a 'dynamic hedging model'. Previously, all currency hedged share classes of Xtrackers ETFs used static monthly hedging, aligned with monthly hedged benchmarks.

Xtrackers direct replication ETF currency hedged share classes will adopt this dynamic hedging methodology in the first half of 2018. One-month FX forward contracts will continue to be used to hedge currency risk, but the contracts will be adjusted whenever predetermined thresholds are breached. The ESMA guidelines stipulate that the hedge must not exceed 105% or fall short of 95% of the asset value of the share class, in practise Xtrackers ETFs will be managed within significantly tighter internal thresholds. This will aim to ensure tighter tracking and more accurate currency hedging.

Currency hedging case study

2017 performance of USD Corporate Bond market for a EUR based investor

The following example uses the Bloomberg Barclays USD Liquid Investment Grade Corporate Index as a proxy for the USD corporate bond market. Here, by comparing the 2017 performance differential between a EUR based investor employing a currency hedged strategy versus a EUR based investor who does not, the importance of currency hedging can be demonstrated.

Below, graph 4 and table 4 show the simulated 1 year performance of Bloomberg Barclays USD Liquid Investment Grade Corporate Index.

GRAPH 4:
Performance of the Bloomberg Barclays USD Liquid Investment Grade Corporate Index unhedged in USD versus unhedged in EUR

Source: Deutsche Asset Management (UK) Limited (DWS), Bloomberg as of 29/12/2017. Past performance, actual or simulated, is not a reliable indicator of future results.

TABLE 4:
Performance of Bloomberg Barclays USD Liquid Investment Grade Corporate Index

Bloomberg Barclays USD Liquid Investment Grade Corporate Index	1yr performance before hedging costs[1 2] (exc. transaction costs & fees)	Estimated 1y hedging costs[3] (exc. transaction costs)	1yr performance after hedging costs[1] (exc. transaction costs & fees)
Unhedged (in USD)	7.32%	–	7.32%
Unhedged (in EUR)	–5.74%	–	–5.74%
Monthly Hedge (EUR)	7.23%	–2.30%	4.93%
Daily Hedge (EUR)	7.28%	–2.30%	4.98%
Dynamic Hedge (EUR)	7.26%	–2.30%	4.96%

Source: Deutsche Asset Management (UK) Limited (DWS), Bloomberg as of 29/12/2017.

[1] Indicative performance before fees and transaction costs.

[2] No adjustments made for forward points (i.e. the time value adjustment made to the FX spot rate to reflect a future date).

[3] Figure –2.30% is estimated annualized cost to hedge USD in EUR. Computed with historical 1-Month FX forward rates – Implied FX forward rates are based on short-term interest rate differentials. Note that a negative figure indicate a cost, i.e. a detractor from performance.

TABLE 5:
Performance of EUR USD foreign currency pairs over 2017

Foreign currency exchange rate	1y performance
EURUSD	13.85%
USDEUR	–12.16%

Source: Deutsche Asset Management (UK) Limited (DWS), Bloomberg as of 29/12/2017.
Note, performance figures are based on DWS simulations.
Past performance, actual or simulated, is not a reliable indicator of future results.

In 2017, the USD corporate bond market returned 7.32% for USD based investors (graph 4). However, over the same period the dollar weakened –12.16% against the euro (table 5), therefore a EUR based investor buying USD corporate bonds who did not currency hedge their exposure would have seen returns closer to –5.74% in 2017 (graph 4). With performance ranging by over 13% depending on an investor's base currency, the impact of currency hedging for a EUR based investor is significant over this period. Please note in practise, currency hedging may add or detract from performance compared to an unhedged benchmark.

In 2017, due to euro strengthening versus the dollar, the performance drag as a result of the forward point (i.e. the time value adjustment made to the FX spot rate to reflect a future date) was around 2.3%, making the ultimate one-month hedged performance around 5%. It is also worth noting that simulations exclude the impact of transaction costs which typically detract from performance and may have a greater overall impact the more often the hedge is reset.

In our example we use three different methods of currency hedging; monthly, daily and dynamic:

MONTHLY hedged performance is 4.93%, simulated assuming the hedge ratio is reset to 100% at the end of each month (i.e. 12 resets over the 1 year period)

DAILY hedging returned 4.98% and assumes 259 resets over the 1 year period as the hedge ratio is reset to 100% at the end of each day

DYNAMIC hedging assumes a reset whenever the hedge ratio is outside of the internal threshold of between 99% and 101%. Over the one year period this would have led to 46 resets and delivered 4.96% performance. Transaction costs for the 46 resets were estimated to be around 4-5bps for the 1 year period.

In all three scenarios, a EUR-based investor could have received performance significantly closer to that of a USD-based investor by currency hedging their exposure compared to taking an unhedged position.

Conclusion

In the first half of 2018, Xtrackers direct replication ETFs will move to adopt a dynamic hedging methodology having previously used a static monthly approach. Both methodologies mitigate currency risk and - as shown in our case study – deliver similar performance. In the case study it is shown that dynamic hedging uses over 82% fewer trades compared to daily hedging as the hedge is only reset when thresholds are breached. Adopting a dynamic hedging methodology will increase the accuracy of the currency hedge compared to monthly hedging, especially in volatile markets as over or under hedged positions will be reset intra-month in response to markets.

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Netherlands

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Spain

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