INDEPTH

# Investor Thinking

Sept 17

For UK Pension Schemes

## MANAGING THE FX BASIS RISK

There are good reasons why UK pension schemes should look to diversify their sterling corporate bond portfolios into foreign corporate bonds. However, this introduces currency risks and non-sterling interest rate exposures into the portfolio. In this paper we show how these challenges can be managed and the resulting impact on the bond portfolio yield.

### UK pension schemes and credit investments

As the trend to de-risk continues for UK pension schemes, investing in corporate bonds as efficiently as possible will grow in importance. Currently, UK pension schemes invest c.20% of their assets in corporate bonds and c.90% of the corporate bonds held are sterling denominated[1]. By comparison, only 30% of schemes' equity portfolios are allocated to UK equities. One way to improve the efficiency of UK pension schemes' credit holdings is to increase the proportion held in foreign corporate bonds. Such a move would offer:

- a larger opportunity set - the UK is only 6% of global corporate bond market
- better diversification by sector, region and currency
- deeper liquidity – traded volume, issuance activity and lower transaction costs

Hence investing in foreign corporate bonds as opposed to only sterling corporate bonds, offers better risk-adjusted rewards for taking similar credit risk. However, for a UK pension scheme, investing in non-sterling credit gives rise to the 'wrong' interest rate exposure as well as currency risk. Typically the main currencies involved are the US Dollar (USD), Euro (EUR) and Japanese Yen (JPY). The diagram overleaf shows the components of yield for an unhedged foreign currency bond portfolio.

Typically, pension schemes will not expect to be rewarded for taking foreign interest rate and currency risks, so how can these unwanted risks be managed and what is the impact on portfolio yield?

[1] Mercer European Asset Allocation Survey 2017

| **Unhedged** foreign currency bond yield | | |
|---|---|---|
| Credit spread | • Compensation for credit spread volatility and default risk | ✓ |
| + | | |
| Long dated foreign interest rate | • Liabilities have GBP interest rate duration | ✗ |
| + | | |
| Foreign currency | • Liabilities denominated in GBP | ✗ |

For illustrative purposes only.

## Hedging interest rate risks

One of the first considerations is to minimise the foreign currency bond portfolio's sensitivity to foreign interest rate risk. Using LDI techniques the scheme will enter into USD, EUR or JPY interest rate swaps as required, agreeing to pay a fixed rate and receiving a floating rate in those respective currencies. This is designed to eliminate the exposure to long-term foreign interest rates. The scheme could then build the appropriate GBP interest rate exposure to hedge its liabilities.

| **Interest rate hedged** foreign currency bond yield | | |
|---|---|---|
| Credit spread | • Compensation for credit spread volatility and default risk | ✓ |
| + | | |
| Floating rate (US minus GBP) + long dated GBP interest rate | • Liabilities have GBP interest rate duration | ✓ |
| + | | |
| Foreign currency | • Liabilities denominated in GBP | ✗ |

For illustrative purposes only.

N.B. Using swaps introduces counterparty credit risks and the need to collateralise positions.

## Hedging currency risks

Primarily, this is about ensuring that the GBP value of a foreign currency bond portfolio does not fall as a result of that currency depreciating relative to GBP. The standard approach to hedging currency risks is to implement a programme of rolling forward foreign exchange (FX) contracts. Schemes can hedge the GBP value of foreign currency bond portfolios by selling the foreign currency value of the portfolio forward for GBP, at an agreed forward FX rate. In doing so, the impact of changes in FX rates is offset by the value of the forward FX contracts. Therefore, the GBP value of the foreign currency bond portfolio, together with the value of the forward FX contracts, remains constant. The forward FX contracts would be rolled at expiry to maintain the hedge.

Ideally schemes will want to ensure a 100% currency hedge through time. In practice, the foreign currency value of the bond portfolio will change due to changes in foreign interest rates or credit spreads and not all cash flows arising from coupons and redemptions will be re-invested. Hence the currency hedge will not remain at 100% unless there are periodic adjustments to the number of forward FX contracts.

Consequently, to keep the hedge close to 100%, it is necessary to rebalance the hedge at sufficiently frequent intervals. This can be achieved by staggering the hedge, initially choosing a mixture of one to six month contracts to initiate the hedging programme so that contract roll dates are spread out over time. This will afford the scheme opportunities to rebalance the currency hedge as the foreign currency value of the bond portfolio fluctuates.

"To keep the hedge close to 100%, it is necessary to rebalance the hedge at sufficiently frequent intervals."

From the discussion so far, a forward FX hedging programme looks to be a robust way of locking down currency risk. However, there is a potentially significant risk embedded in this approach that can be easily overlooked: FX basis risk.

## What is FX basis risk?

In theory, forward FX rates for a currency pair should reflect the differential in interest rates for the two currencies over the term of the forward FX contract. The technical term for this rule is Covered Interest Parity (CIP). However, actual forward FX rates deviate from the theoretical level.

This deviation from CIP is termed the 'FX basis' and has been substantial since the financial crisis. Typically, owing to high demand for USD versus other currencies, investors hedging USD exposures have lost money by paying away the FX basis.

The following example illustrates how the FX basis arises. Consider a UK corporate needing to borrow USD. The corporate would typically have better access to funding in GBP and could therefore:

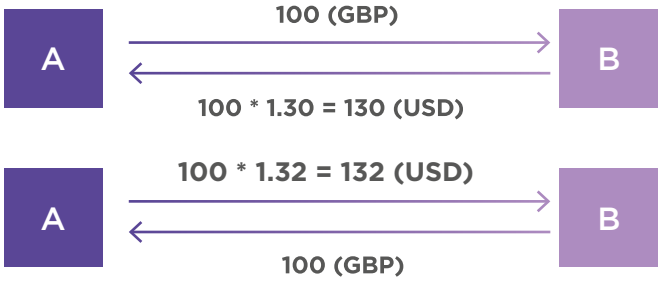
**Step 1:** Borrow GBP in the UK market, agreeing to pay GBP LIBOR on that borrowing (plus a credit spread).

**Step 2:** Transform this borrowing into USD borrowing through an FX swap. This would involve simultaneously lending the GBP raised and borrowing USD from a willing counterparty. The diagram overleaf illustrates the cash flows for an FX swap.

## FX swap contract

At the start of the contract, A borrows 130 USD (100 * 1.30) from B, and lends 100 GBP to B, where 1.30 is the spot FX rate at the start of the contract.

When the contract expires, A returns 132 USD (100 * 1.32) to B, and B returns 100 GBP to A, where 1.32 is the forward rate agreed at the start of the contract.




For illustrative purposes only.

The initial exchange is at the current ('spot') USD/GBP FX rate. The two parties would also agree the forward FX rate at the outset - the rate at which GBP and USD is to be exchanged at the end of the contract – this metric is where the contract is priced.

"The FX basis is a cost that detracts from the credit spread achieved on a foreign currency bond portfolio."

CIP theory, dictates that the GBP institution should agree to pay USD LIBOR in exchange for receiving GBP LIBOR, and the forward FX rate agreed in the FX swap would reflect the interest rate differential of the currency pair. This would be the case, if the demand for borrowing USD versus borrowing GBP was evenly balanced. However, over the last decade or so, UK corporates and banks have tended to accept less than GBP LIBOR to enter into the FX swap, sometimes considerably less. The extent to which they are willing to receive a lower rate than implied by CIP, is known as the FX basis.

### How does FX basis impact foreign currency bond yields?

We can think of the FX basis as a cost that detracts from the credit spread achieved on the foreign currency bond portfolio as depicted below.

**FX Hedged** foreign currency bond yield

Credit spreads

+

Floating rate (US minus GBP) + long dated GBP interest rate* + FX basis

**Currency hedging impact (if rolling FX forwards)**

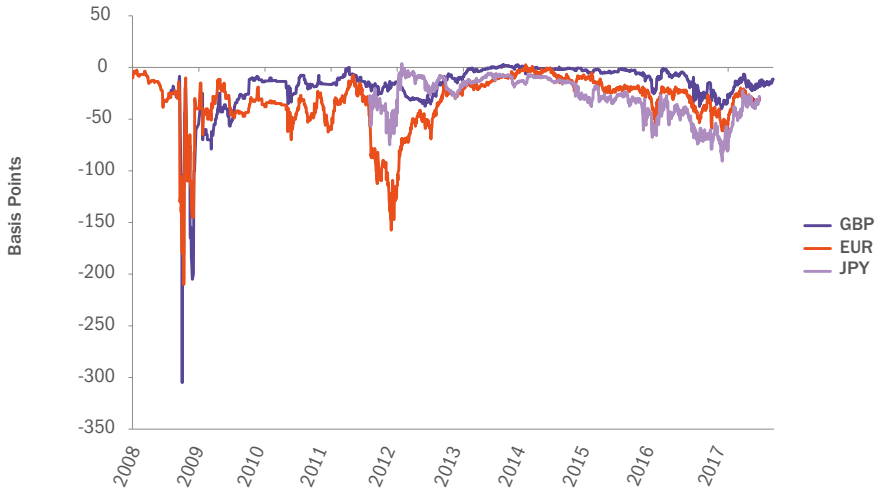
Credit spread **MINUS** FX basis realised over term of hedging programme

For illustrative purposes only. *Assumes a GBP liability hedge.

The issue is that this cost can be high at times of market stress, thus representing a risk to the yield ultimately achieved on a portfolio of currency-hedged foreign bonds; a risk that may be worth hedging.

Figure 1 shows the history of three month FX basis for the main currencies versus USD. Historically the FX basis has been close to zero and stable. However, it spiked during the financial crisis and has been volatile ever since. Note, the convention is to express the FX basis versus paying USD LIBOR, and therefore is expressed as a negative addition when there is relatively more demand for USD borrowing.

## Figure 1: 3-month FX basis vs USD




Source: Bloomberg, as at September 2017.

## What drives the FX basis?

Relative demand for borrowing in currency pairs gives rise to the FX basis, and this impacts the pricing of currency derivatives. A key question to answer therefore is 'what drives this relative demand?'

Non-US borrowers may need USD for various reasons. Examples include:

- European banks that are funded through deposits in EUR but lend funds in USD. To hedge the currency risk implied by this lending they will enter into FX swaps. These transactions enable them to transform their EUR funding (the EUR deposits) into USD funding, so matching the currency that they are lending. This provides access to the USD lending market and they are willing to pay a premium for this facility in the form of the FX basis.
- Non-US corporates can raise funds opportunistically in their domestic markets and then use the FX swap market to change this into USD borrowing (as explained above). In fact, US based corporates may find that they can issue bonds in GBP, EUR or JPY and then hedge their FX exposure through FX swap markets, thus resulting in a lower funding cost than directly issuing USD bonds.

The extent of the USD FX basis has been aided by the European and Japanese Quantitative Easing (QE) programmes, which have resulted in ultra-low interest rates. This has driven down the cost of lending in both EUR and JPY, thereby putting pressure on the FX basis to remain in negative territory.

It is not clear whether the FX basis will return to being close to zero. It will be driven by the policy and regulatory environment going forward and how this impacts relative demand for currencies. What is clear though is that the FX basis can be high at times of stress and therefore represents a potential risk and a cost to a UK pension scheme looking to hedge FX exposures.

## Hedging the FX basis risk

To hedge the FX basis risk, pension schemes can enter into cross-currency basis swaps.

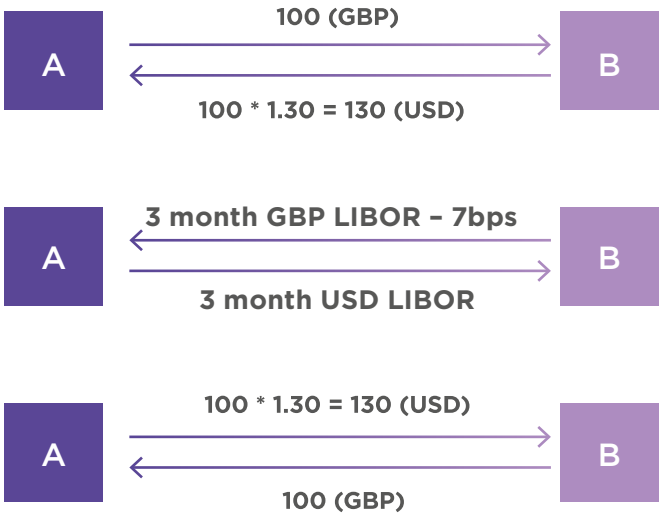
A cross-currency basis swap is a contract between two parties. Party A borrows an amount in one currency (e.g. 130 USD) from Party B. At the same time, Party A simultaneously lends the same value, at current spot rates, of a second currency to Party B (e.g. 100 GBP, based GBP/USD FX rate of 1.30). The chart below illustrates the flow of funds involved in a GBP/USD cross-currency basis swap.

### Cross-currency basis swap

At the start of the contract, A borrows 130 USD (100 * 1.30) from B, and lends 100 GBP to B, where 1.30 is the spot FX rate at the start of the contract.

During the contract term (including at expiry), A receives GBP 3M Libor – 7 bps from B, and pays USD 3M Libor to B, every three months, where - 7 bps is the price of the FX basis swap, agreed upon by the counterparties at the start of the contract.

When the contract expires, A returns 130 USD (100 * 1.30) to B, and B returns 100 GBP to A, where 1.30 is the same FX spot rate as of the start of the contract.




For illustrative purposes only.

The effect of entering into such a swap is to replicate the forward FX hedging programme (discussed earlier) over the term of the contract, but importantly fixing the FX basis at the outset (the FX Basis term which is -7bps in the above diagram), thereby removing the FX basis risk. Cross-currency basis swaps are long-term contracts, generally ranging between 1 and 30 years in maturity.

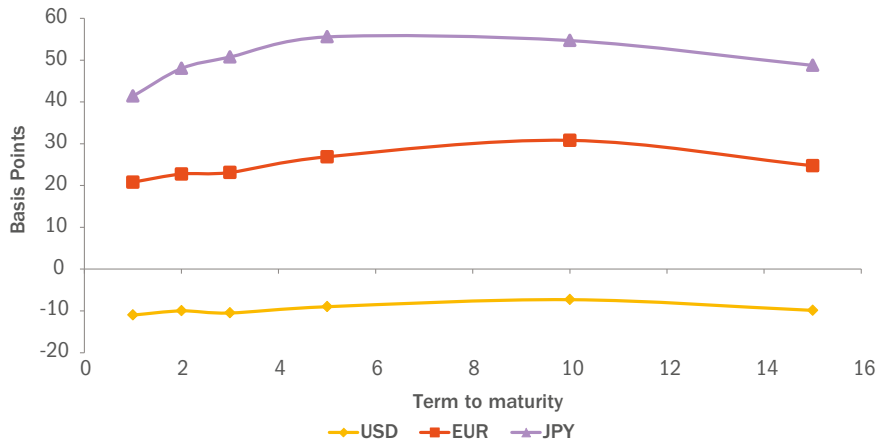
**The impact on yield**

As noted, the FX basis is essentially a cost that potentially detracts from the credit spread achieved on a currency-hedged foreign bond portfolio. If the currency hedging is done using FX forwards, then this cost will vary and can be substantial at times. This is therefore a risk. However, by using cross-currency basis swaps, we can be more certain as to the credit spread that will be achieved, as the FX basis cost is then fixed for the term of the contract and known at the outset.

## What is the current level of the FX basis?

For UK pension schemes contemplating investing in a portfolio of foreign currency bonds, it is useful to know the FX basis varies by term to maturity for the main foreign currency bond markets. Figure 2 shows the current FX basis for a GBP investor looking to hedge the FX basis over different maturities.

### Figure 2: FX basis for a GBP investor




Source: Bloomberg, as at 21 June 2017. Past performance is not indicative of future results.

It is interesting to note that at present, for a UK pension scheme considering whether to invest in a foreign currency bond portfolio, the FX basis is negative for USD bonds but positive for EUR and JPY bonds. Therefore, while the local currency observable spread available from USD bonds is reduced by the FX basis, there is actually an uplift to the corresponding credit spread available from EUR and JPY denominated bonds owing to the positive FX basis. In Table 1 we compare the current credit spreads and the currency FX basis impact for a UK pension scheme looking to hedge USD, EUR and JPY currency risks (thus fixing the FX basis cost for 10 years).

"It is interesting to note that at present, for a UK pension scheme considering whether to invest in a foreign currency bond portfolio, the FX basis is negative for USD bonds but positive for EUR and JPY bonds."

### Table 1: FX basis impact for a UK pension scheme looking to hedge USD, EUR and JPY

| Currency | Local currency credit spread | 10-year FX basis | Net credit spread |
|---|---|---|---|
| GBP bonds | 111 | N/A | +111 |
| USD bonds | 118 | -7 | +111 |
| EUR bonds | 49 | +31 | +80 |
| JPY bonds | 16 | +55 | +71 |

Source: Bloomberg, as at 31 August 2017. Past performance is not indicative of future results.

Currently therefore, a UK pension scheme diversifying into foreign currency corporate bonds can benefit not only from portfolio diversification but also more attractive and stable currency hedged yields.

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Design & Production: AXA IM London Corporate Communications 21116 09/17. Produced using stock that is FSC certified.

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Issued by AXA Investment Managers UK Limited registered in England No 01431068.
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