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Quantitative Portfolio Strategy
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Portfolio Performance Drag from FX Hedging Rebalancing Costs

- Global foreign investors often give their portfolio managers fixed income mandates that hedge currency risk using overlays of FX forwards or cross-currency swaps.
- While the cost of reinvesting any FX hedging-related P/L is typically not reflected in index performance, these FX-related incremental rebalancing costs, called uncompensated transaction costs (UTC), are a real performance drag for portfolio managers. Using Barclays Liquidity Cost Scores (LCS) we quantify incremental transaction costs induced by hedging portfolio returns into G10 currencies for various fixed income mandates.
- We show that the performance drag from hedging less liquid indices into volatile currencies can be significant, especially during times of market distress.
- As a general practice, induced transaction costs are shared by all owners of the underlying portfolio, including domestic investors who do not require currency hedging. This can potentially lead to a conflict of interest between domestic and foreign investors.
- We consider possible remedies to reduce transaction costs, including less frequent reinvestment of FX P/L and using fixed income exchange traded funds (ETF) for cash flow management.

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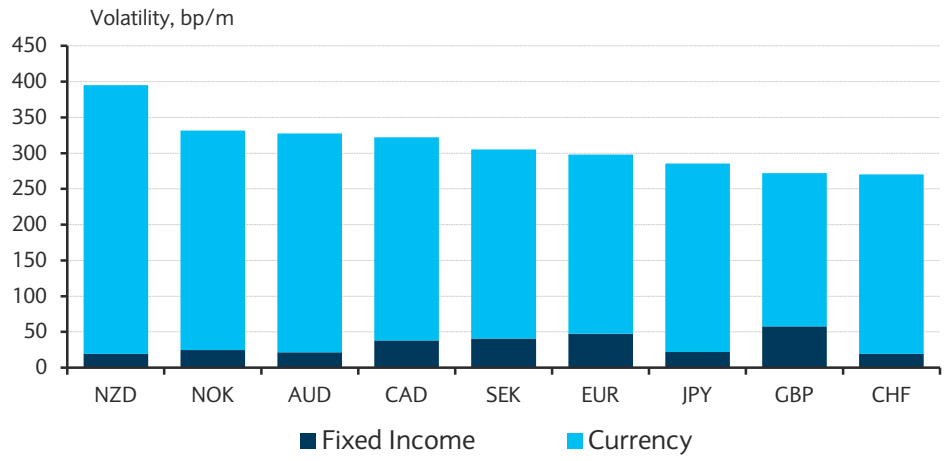
Introduction

Global fixed income investors often prefer to hedge currency exposure. While currency risk can easily dominate the risk profile of an unhedged fixed income portfolio (see Figure 1), the FX premium per unit of risk is typically small[1].

FIGURE 1

Contribution of FX to the overall risk of the the unhedged US IG Corporate index in different currencies, April 2016



Source: Barclays POINT

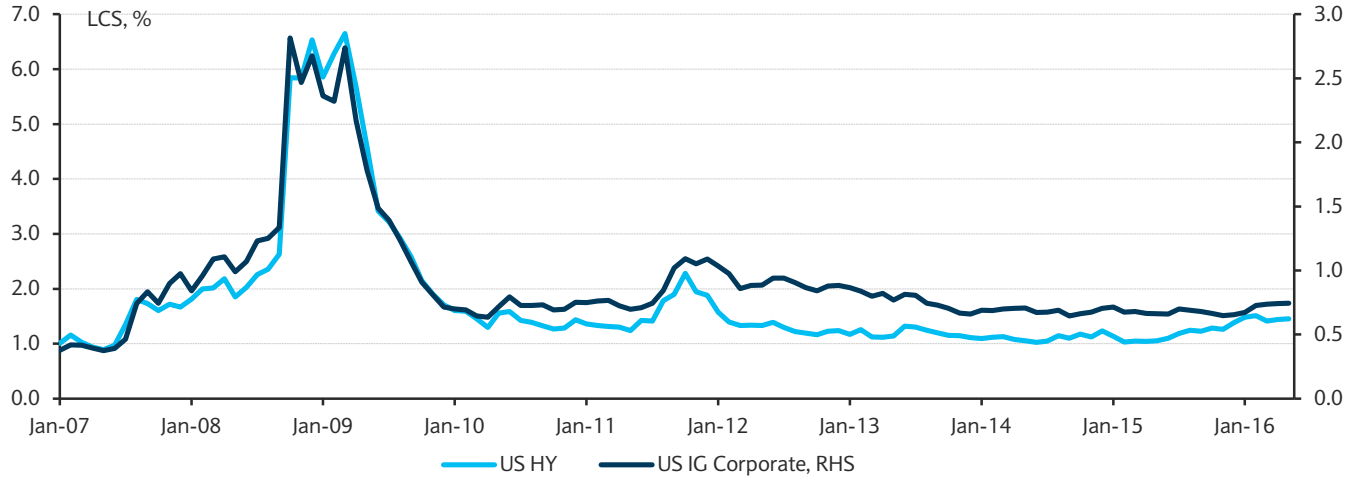
Most currency-hedged indices implement FX hedging with 1-month forward contracts, and reinvest any monthly currency gains back into the underlying index bonds (or cover any losses). If an investor's base currency appreciates versus the native currency of the index, the hedging overlay generates a mark-to-market gain which is essentially reinvested pro-rata across all bonds in the underlying index to reflect the increase in the index market value. Similarly, if the investor's base currency depreciates, the hedging overlay produces a loss which the index covers by essentially reducing, pro-rata, all bonds in the index to reflect the reduction in the index market value. In effect, indices reinvest or raise cash at no cost to index performance.

In stark contrast, portfolio managers are keenly aware that their portfolios bear a cost to manage the cash flows resulting from currency hedging to remain fully invested. This cost can be particularly painful when underlying markets are less liquid. For example, historical liquidity cost scores (LCS)[2] of the US corporate IG and HY bond indices shown in Figure 2 imply that reinvesting FX hedging gains could have cost as much as 2.7% and 6.5%, respectively, of the reinvested amount at the peak of the 2008 crisis. This is a performance drag suffered by the portfolio manager, not the index.

[1] High yielding currencies should in theory depreciate relative to low yielding currencies over long run to offset their carry advantage. This phenomenon is called uncovered interest rate parity (UIP). See for example Isard, P., 'Uncovered Interest Parity', IMF Working Paper, 2006.

[2] Liquidity cost score (LCS) measures the round-trip cost, as a percentage of a bond's value, of an institutional size transaction. LCS is calculated based on trader bid-offers quoted to portfolio managers. Barclays has published bond-level LCS since 2007. See *Measuring Bond-Level Liquidity: Liquidity Cost Scores (LCS)*, Barclays Research, 24 July 2015.

FIGURE 2
Liquidity cost scores (LCS) for the USD IG Corporate and HY indices



Source: Barclays Research

We quantify the portfolio performance drag resulting from the turnover and transaction costs (TC) arising from currency hedging for several USD fixed income indices hedged into G10 currencies. This analysis extends our previous study on uncompensated transaction costs (UTC) in USD HY mandates hedged into EUR[3].

We find that FX hedging rebalancing costs tend to be more significant for less liquid portfolios and more volatile currency pairs.

In addition to the performance drag relative to an index, FX hedging TCs raise other portfolio management issues. Hedging-related TCs are often shared pro-rata across portfolio owners, including domestic investors who do not require currency hedging. This can potentially create a conflict of interest between owners of hedged and unhedged share classes in a same fund.

We consider some remedies to reduce these costs, including less frequent reinvestment of currency gains and losses and using fixed income ETFs for lower-cost liquidity management.

Section 1 explains monthly index rebalancing and turnover resulting from currency hedging. Section 2 quantifies hedging-related transaction costs for several Barclays bond indices hedged into G10 currencies. Finally, Section 3 describes possible remedies to reduce these transaction costs, including diversification of portfolio turnover across multiple currency-hedged share classes.

Components of index turnover

The mechanism by which currency hedging produces incremental portfolio turnover and transaction costs is straightforward. The currency overlay designed to hedge FX exposure of the underlying index generates monthly gains (or losses) which have to be reinvested (or covered). An index accomplishes this by essentially reinvesting (or disinvesting) in itself, all at the index bid side marks. However, for a hedged portfolio tracking the hedged index, any FX gains (or losses) give rise to portfolio turnover and require bond transactions to remain fully invested and match index bond weights. Transactions arising from FX heging gains can produce performance drag as managers must pay the market Bid-Ask spread. These costs are higher if the underlying portfolio is less liquid.

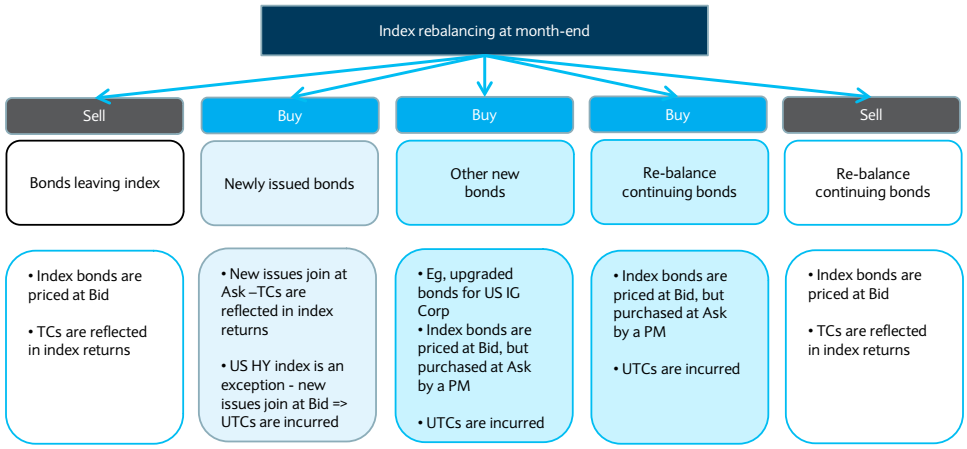
[3] See *HY Investing: Manager Performance Drag from Uncompensated Transaction Costs*, Barclays Research, 17 February 2012.

For example, a European investor in the US Corporate Index hedged into EUR generates a cash P/L gain from the FX hedge if the EUR appreciates versus USD[4]. The manager would have to reinvest this gain into a pro-rata "slice" of the underlying bond portfolio (ie, by buying cash bonds at the Ask price) to remain fully invested. Similarly, the EUR-USD hedge generates a cash P/L loss if the EUR depreciates, requiring the investor to sell a pro-rata slice of the underlying portfolio (ie, by selling cash bonds at the Bid price) to cover the required cash outflow and remain fully invested in the index[5].

Since many fixed income indices price their constituents at Bid, a manager with a hedging loss would not experience incremental transaction costs relative to the index when liquidating a slice of the portfolio. In contrast, a manager with a hedging gain would typically generate a performance drag relative to the index because the manager purchases bonds at Ask prices which are then marked at the index Bid price[6].

FIGURE 3

Buy and sell transaction categories in monthly index rebalancing



Source: Barclays Research

We separate monthly index turnover into buy and sell components (see Figure 3). For a manager precisely replicating an index, there are two types of sell transactions. First, the manager must sell bonds that leave the index. This category can include, for example, downgraded issues and bonds with less than one year remaining until maturity[7]. Second, a manager must sell portfolio constituents when the index is rebalanced. For example, selling bonds might be required to adjust their market value index weights if the amount of new index bonds entering the portfolio is large.

The manager has three types of buy transactions: buying newly-issued bonds, buying seasoned bonds transitioning to the index from another index (*eg,* upgraded or downgraded bonds bonds for IG or HY indices respectively), and buying existing index bond holdings to balance cash flows. Newly-issued bonds are typically added to the index at Ask prices (with the notable exception of the US HY Index), so there are no incremental transaction costs for the manager relative to the index[8]. A replicating manager must also

[4] In practice, EUR investors would typically implement hedging with 1 month forwards. A currency gain occurs if the EUR-USD spot increases relative to its forward rate set at the beginning of the month. To keep our discussion simple, however, we keep these technical details in the background and talk about "appreciation of EUR relative to USD", which provides good economic intuition. Our quantitative results, however, appropriately account for these technical details.

[5] In our analysis, we assume the investor is fully replicating the underlying index. In practice, the investor would hold a subset of index bonds. This subset may be more or less liquid than the index as a whole. An investor could use our bond-level LCS to more precisely measure the FX-related uncompensated transaction costs for a particular portfolio.

[6] We are implicitly assuming that the manager executes all transactions at the index close at the end of the month.

[7] For more details on index construction rules see *Barclays Benchmark Index Methodology*, Barclays, 28 May 2014.

[8] Barclays US HY index is an exception from this rule as newly issued bonds are added at Bid prices. In pracactice a portfolio manager has to buy these securities at Ask prices and, therefore, incures uncompensated transaction costs, see *HY Investing: Manager Performance Drag from Uncompensated Transaction Costs, February 2012, Barclays*.

purchase transitioning securities that satisfy index inclusion rules. For example, US IG Corp index adds bonds upgraded from HY at Bid and, therefore, triggers uncompensated transaction costs as the portfolio manager buys them at Ask. Finally, weights of index bonds can increase if the cash balance resulting from received coupons and sold bonds leaving the index is higher than the value of newly-issued bonds. Buying these add-ons for the portfolio leads to UTC and a performance drag relative to the index.

How much a month's FX hedging P/L contributes to UTC depends on the index's end-of-month cash balance before FX P/L is taken into account. The index end-of-month cash balance equals the cash resulting from coupons and selling bonds leaving the index minus cash spent on newly-added bonds (new issues and seasoned bonds joining the index). FX overlay P/L can increase or decrease the index end-of-month cash balance. If the overall cash balance increases, UTC typically rises. If the cash balance decreases, UTC declines or remains the same (see Figure 4).

FIGURE 4

Effect of the cash balance on uncompensated transaction costs

Net Cash Balance ex FX P/L	FX P/L	Net Balance withFX P/L	FX Hedging Incremental Effect on UTC
Positive	Positive	Positive	Increase
Positive	Negative	Positive/Negative	Decrease
Negative	Positive	Positive	Increase
Negative	Positive	Negative	=
Negative	Negative	Negative	=

Source: Barclays Research

Rebalancing costs induced by FX hedging for a manager replicating the US IG Corporate Index

Using the US Corporate Index as an example, Figure 5 shows index turnover components as market value percentages[9]. The first row shows annual average turnover components in the unhedged index. The first column shows received coupons. The next two colums show cash generating components of turnover (ie, sold bonds): bonds leaving the index and rebalancing sells. For example, on average, 11.2% of the index MV leaves the index each year due to index rules and 7.2% of the index MV is sold to rebalance index market value weights[10]. Columns 4-6 show the components consuming cash (ie, purchased bonds): new issues, seasoned bonds transitioning into the index, and rebalancing buys. For example, on average 20% of the index market value each year is new issues entering the index, 1.8% is issues transitioning into the IG index from another index and 1.5% of index MV is bought to rebalance index market value weights. Total sells (first three columns) equal total buys (next three columns).

[9] We use market value of the unhedged index to have a common base across all currencies.
[10] Strictly speaking the index does not sell bonds to rebalance index weights as the index market value ebbs and flows with bonds leaving and bonds entering. However, a portfolio manager with a fixed investment must perform rebalancing buy and sell transactions to track rebalanced index weights. For this paper we treat the portfolio manager as one who aims to fully replicate index performance by holding all index bonds at current index weights.

FIGURE 5

Incremental turnover and UTC induced by currency hedging of the US IG Corporate Index, Feb 2007 – March 2016

Base Currency	Coupons or FX P/L	Leaving Bonds	Rebalancing Sell	New Issues	Other Joining Index	Rebalancing Buy	Transaction Cost (UTC)
USD	4.9%	11.2%	7.2%	20.0%	1.8%	1.5%	3.1bp/y
In Excess of the UH Index							
NZD	4.1	0.0	14.4	0.1	0.0	18.4	18.3
AUD	3.7	0.0	13.2	0.1	0.0	16.8	17.0
CHF	2.4	0.0	10.4	0.0	0.0	12.8	12.7
SEK	-0.8	0.0	13.2	0.0	0.0	12.4	12.5
NOK	-1.1	0.0	13.5	0.0	0.0	12.3	11.1
JPY	0.1	0.0	10.7	0.0	0.0	10.9	11.6
EUR	-1.1	0.0	11.1	0.0	0.0	10.0	10.3
CAD	-0.2	0.0	10.3	0.0	0.0	10.1	9.3
GBP	-2.7	0.0	10.3	0.0	0.0	7.7	6.9

Source: Barclays Research

Which of these components produce performance drag for the unhedged replicating index investor? Note that *leaving bonds*, *rebalancing sells*, and *new issues* are the most significant turnover components of the unhedged investor, with average annualised volumes of 11.2%/year, 7.2%/year, and 20%/year, respectively. These transactions, however, do not lead to uncompensated rebalancing costs as bonds being sold (at Bid) are already priced at the index Bid, while new issues joining (purchased at Ask) are priced at the index Ask.

Performance drag for an unhedged portfolio manager arises whenever he or she must conduct rebalancing buys (1.5%) or must buy seasoned bonds joining the index (1.8%). These buys are at the Ask whereas the index adds them, and marks them, at Bid[11]. For the US IG Corporate index these costly purchases have averaged 3.3% of index market value per year.

The last column shows that these two costly purchases produced an average UTC performance drag of 3.1bp/year between 2007 and 2016.

Starting from row 2, Figure 5 reports turnover components and UTC for the US IG Corporate index hedged into different base currencies, *in excess of* the respective statistics of the unhedged index shown in the first row. The last column reflects the incremental impact of currency hedging on a manager's performance relative to the index.

For example, for an investor hedged to NZD, there was an average 18.4% annual market value FX hedging gain (for months with gains) which would require costly rebalancing buys, offset by 14.4% annual FX hedging losses (for months with losses) which would require (cost free) rebalancing sells. Overall, the hedged NZD investor experienced an average annual net 4.1% FX hedging P/L gain.

Incremental turnover cost from FX hedging is asymmetric. FX hedging gains incur incremental UTC while FX hedging losses can sometimes produce negative incremental UTC, but only to the extent that the unhedged index has net cash that would produce rebalancing buys.

For the hedged NZD investor, reinvesting FX hedging P/L produced an annual average performance drag of 18.3bp. As shown, depending on the currency, the incremental UTC has varied between 18.3bp and 6.9bp/year, generally descending with the amount of annual FX hedging gains. Notably, the annual UTC from FX hedging has significantly exceeded the 3.1bp/year average UTC of the unhedged index.

[11] Figure 5 shows that the index generates a lot of cash. If not for the large amount of new issues during the period, the level of rebalancing buys (and, consequently, performance drag) would have been much larger.

The UTC from FX hedging depends not only on the magnitude of the FX P/L gain, but also on the level of corporate bond market liquidity (LCS) at the time that the gain is reinvested. This explains, for example, why the GBP-hedged investor, who experienced an average 2.7% FX hedging loss from 2007-2016, still had to endure a positive incremental FX hedging UTC of 6.7bp/year. Years with FX hedging gains coincided with high LCS whereas years with FX hedging losses coincided with low LCS. In addition, effects of FX gains and losses on portfolio UTC are not symmetric since FX losses do not typically result in lower UTC for the US IG Corporate index.

To show this more clearly, Figure 6 reports annual UTC from hedging the US IG Corporate index into G10 currencies. The 2008-2009 crisis was associated with elevated incremental FX hedging UTC, exceeding 30bp for some currencies. For example, hedging into JPY and CHF during 2008 was costly since these currencies appreciated relative to USD at a time of elevated LCS. Similarly, hedging into AUD, NZD, SEK, NOK and CAD was costly in 2009 as the respective currencies gained versus USD when LCS remained high. Despite a decline in LCS after 2009, hedging into AUD and NZD continued to produce a significant performance drag as these currencies continued appreciating. In contrast, hedging index returns into currencies that depreciated led to lower incremental UTC. In recent years (2013-2016), FX hedging UTC has been relatively low as the USD has tended to appreciate and market liquidity improved.

FIGURE 6

Incremental yearly UTC from FX hedging, US IG Corporate Index, hedged into G10 currencies

			AUD	CAD	CHF	EUR	GBP	JPY	NOK	NZD	SEK
Year	**Avg. LCS, bp**	**UTC UH, bp**	**Incremental UTC from currency hedging (in excess over UH index), bp**								
2007	80bp	4.0bp	10	8	3	4	2	5	6	8	5
2008	177	5.1	20	2	41	27	-2	49	4	17	10
2009	172	3.3	55	34	16	20	23	13	33	61	42
2010	96	2.7	19	8	14	10	6	15	13	15	15
2011	107	3.9	19	10	15	11	10	6	14	17	13
2012	125	3.3	13	8	8	7	8	6	13	17	13
2013	96	2.5	4	4	6	7	7	2	5	10	6
2014	82	1.2	6	2	2	1	3	2	5	7	1
2015	89	1.6	4	4	8	5	5	5	5	10	6
2016 (to March)	94	0.4	6	5	4	3	2	5	4	5	4
Year	**Avg. OAS, bp**	**Avg. Balance UH**	**Spot FX Returns, %**								
2007	124bp	-0.83%	11	18	8	11	2	7	15	9	6
2008	356	-0.51	-21	-20	6	-5	-28	23	-22	-24	-18
2009	326	-0.54	29	18	3	3	12	-3	21	25	11
2010	170	-0.25	14	6	11	-6	-3	15	-1	7	6
2011	179	-0.26	0	-2	0	-3	-1	5	-3	0	-2
2012	174	-0.48	1	2	2	2	5	-11	7	6	5
2013	135	-0.36	-14	-6	3	5	2	-18	-8	0	1
2014	110	-0.27	-9	-8	-10	-12	-6	-12	-19	-5	-18
2015	147	-0.79	-11	-17	-1	-10	-5	0	-15	-12	-7
2016 (to March)	184	-0.50	6	7	5	5	-2	7	7	1	4

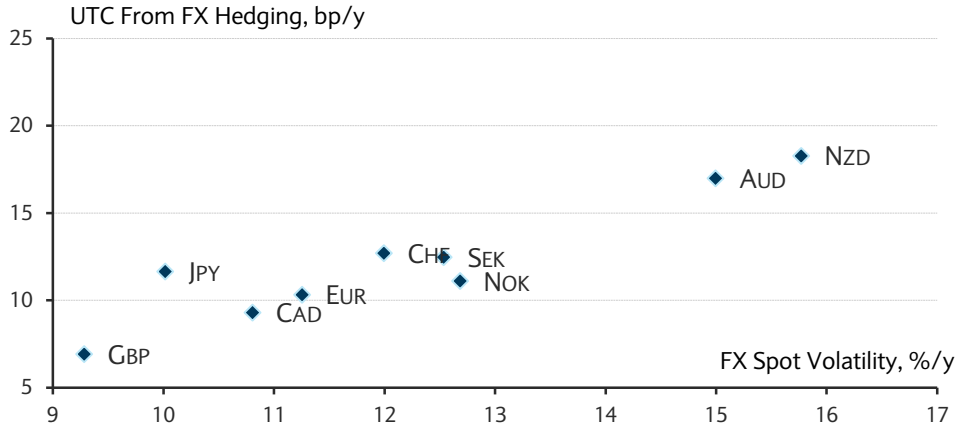
Source: Barclays Research

As FX hedging gains generally lead to positive incremental UTC, whereas FX hedging losses produce negative incremental UTC (but only if the unhedged index's net cash balance is positive), FX hedging-related UTC depends on the volatility of the FX rate. Indeed, the UTC for more volatile currencies should be higher. In order to illustrate this, we plot FX-related

UTC versus FX spot volatilities of the corresponding currencies in dollar terms. Figure 7 shows that incremental FX hedging UTCs tend to be higher for more volatile currencies.

FIGURE 7

Incremental UTC from hedging the US Corporate index into G10 currencies versus FX dollar spot volatilities, February 2007 – March 2016



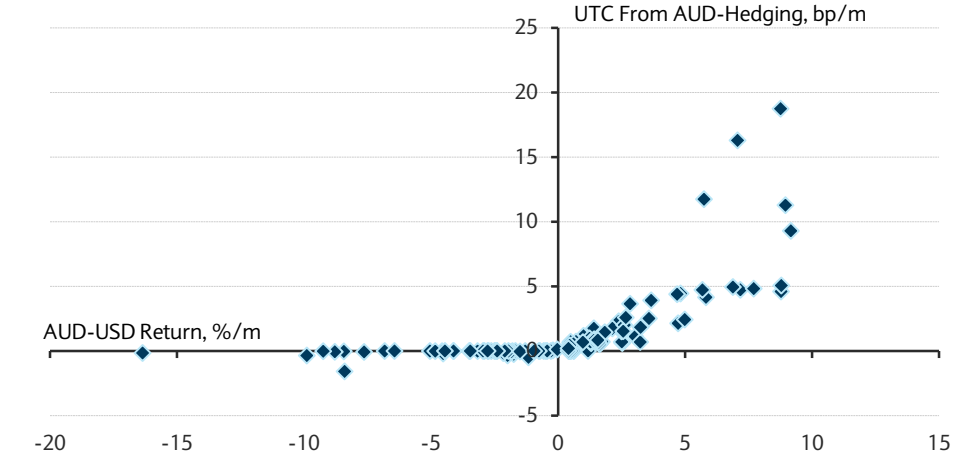
Source: Barclays Research

In addition, "safe haven" currencies (JPY and CHF), which tend to appreciate during volatile and less liquid market environments, have slightly higher FX-related UTC given their volatility level, compared to other currencies.

Selling bonds from the index when currencies depreciate generally produces very small incremental FX hedging-related UTCs[12]. Figure 8 illustrates this for the case of the US Corporate index hedged into AUD. The portfolio suffered incremenal UTCs when AUD appreciated relative to USD as FX gains had to be reinvested into the underlying portfolio. FX losses, on the other hand, further reduced negative balances of the US IG Corporate index and, therefore, did not typically lead to lower UTCs.

FIGURE 8

Incremental UTC induced by hedging the US IG Corporate index into AUD vs. spot AUD-USD returns, February 2007 – March 2016



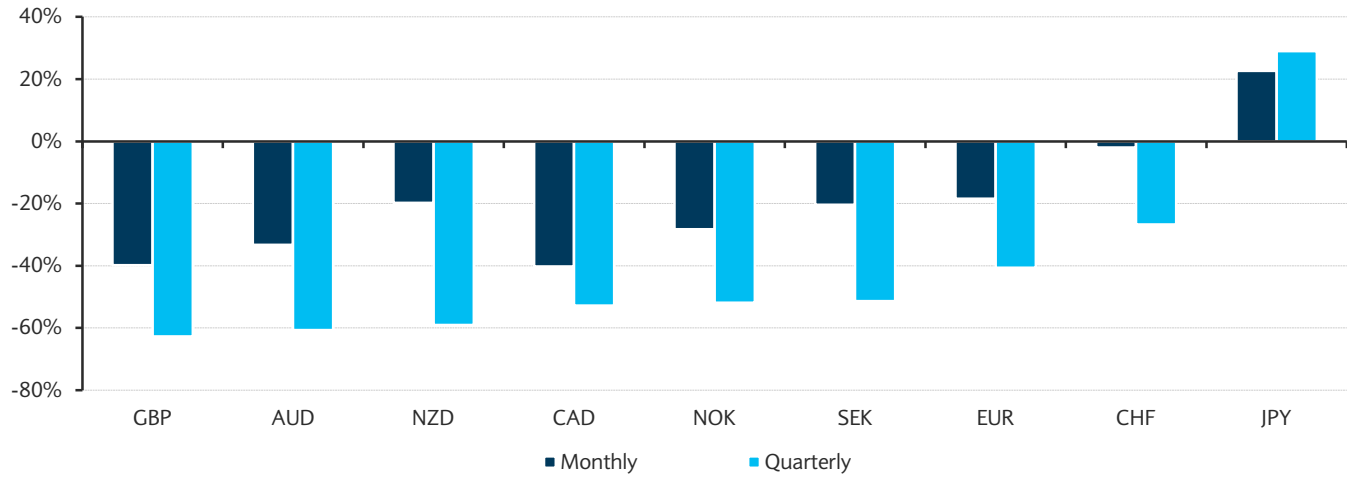
Source: Barclays Research

[12] If the net cash balance of the unhedged index was significantly positive, a FX hedging loss could result in a significant negative incremental UTC as a lower cash balance would have to be reinvested at Ask. Positive net cash balances, however, rarely occur for the US IG Corporate index.

As discussed, FX-hedging UTCs are also higher for currencies that tend to appreciate when the credit market becomes less liquid. Figure 9 shows correlations between changes in LCS and currency dollar returns. The FX-LCS correlation is indeed positive for JPY and low in absolute terms for CHF, but negative for all the other currencies. This explains higher UCTs per unit of volatility for indices hedged into JPY and CHF.

FIGURE 9

Correlations between FX returns and changes in LCS of the USD IG Corporate Index, February 2007 – March 2016



Source: Barclays Research

Extending the analysis to other indices

We now calculate the incremental FX hedging-related UTCs for currency-hedged versions of several Barclays fixed income indices (Treasury, IG Corporate, EM Sovereign and High Yield).

Figure 10 shows the average incremental FX hedging UTCs for US IG Corporate, IG Credit and High Yield indices between 2007-2016.

FIGURE 10

Incremental UTC from FX hedging, US bond indices, bp/yr, February 2007 – March 2016

	Barclays US IG Corp bp/yr	Barclays US IG Credit bp/yr	Barclays US HY bp/yr
Unhedged (UH)	3.1	3.1	71.6
	In Excess of UH Indices		
Hedged NZD	18.3	17.0	28.8
Hedged AUD	17.0	15.7	26.3
Hedged CHF	12.7	11.8	18.6
Hedged SEK	12.5	11.7	17.6
Hedged NOK	11.1	10.1	14.9
Hedged JPY	11.6	10.7	21.4
Hedged EUR	10.3	9.7	16.2
Hedged CAD	9.3	8.6	9.7
Hedged GBP	6.9	6.2	3.5

Source: Barclays Research

Figure 11 adds results for US Treasury, EM Sovereign, and EM Aggregate indices, but reports average UTCs for a shorter period (2012 – 2015) due to more limited LCS history for these markets[13].

FIGURE 11

Incremental UTC from FX-hedging, US bond indices, bp/yr, February 2012 – March 2016

	Barclays US Treasury bp/yr	Barclays US IG Corp bp/yr	Barclays US IG Credit bp/yr	Barclays EM USD Sovereign bp/yr	Barclays EM USD Agg bp/yr	Barclays US HY bp/yr
Unhedged (UH)	0.17	2.1	2.4	5.4	8.6	40.5
In Excess of UH Indices						
NZD	0.39	10.3	9.5	8.6	8.9	11.7
AUD	0.25	6.8	6.2	5.1	5.8	6.8
CHF	0.23	6.2	5.5	4.6	5.1	5.3
SEK	0.24	6.9	6.4	5.2	5.4	6.8
NOK	0.27	7.1	6.3	6.0	6.1	6.1
JPY	0.14	4.4	4.1	3.3	3.7	4.8
EUR	0.20	5.5	5.0	4.5	3.8	4.7
CAD	0.20	5.2	4.6	3.4	3.8	3.0
GBP	0.21	5.5	4.9	3.9	3.6	5.1

Source: Barclays Research

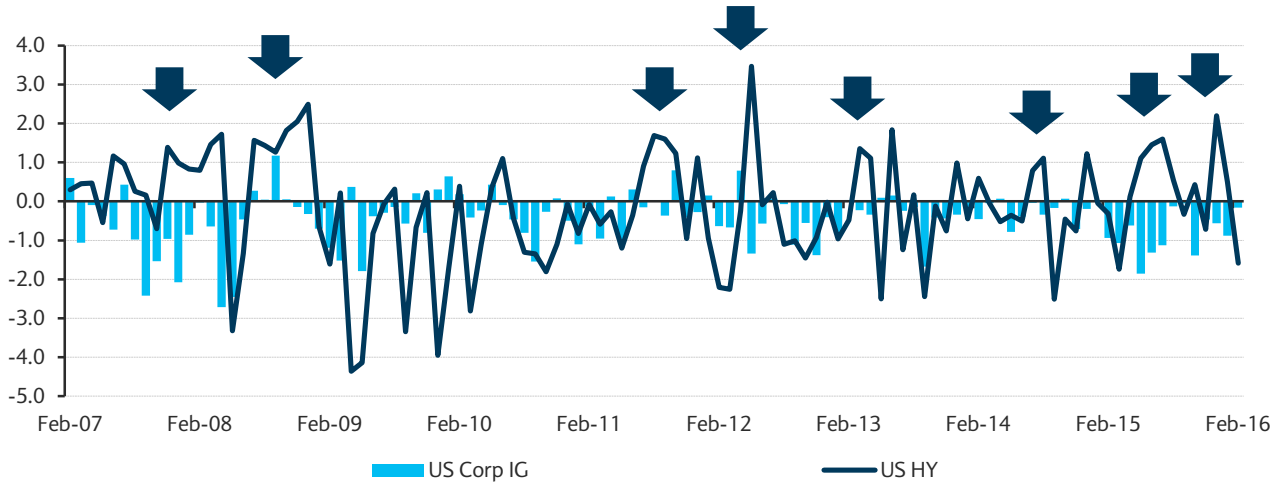
There are two interesting observations. Firstly, UTC of the unhedged US HY is much higher (40.5bp/year) than that of any other index (the first row of the figures). The reason for this is that in contrast to other indices, the US HY index includes new issues at Bid, while the portfolio manager must pay the Ask. Therefore, the market value of all newly-issued HY bonds must be added to the net cash balance that contributes to the UTC of the unhedged HY index.

Secondly, the incremental UTC of hedged USD HY indices (over that of the unhedged index) are comparable or sometimes lower than those of respective currency-hedged USD IG Corporate indices, especially in the recent period between 2012 and 2016. For example, average UTC induced by hedging into GBP is lower for USD HY than for US IG Corp in both 2007-2016 and 2012-2016. At the same time, LCS of the HY index is significantly higher than that of the IG index (Figure 2). This seeming contradiction is explained by the fact that monthly net cash balances of the HY index before accounting for FX P/L are often positive, while those of the IG index are generally negative as shown in Figure 12. As a result, FX overlay losses help reduce positive balances of the HY index and, subsequently, lead to negative incremental UTCs. In contrast, FX losses do not produce an incremental UTC benefit for the IG Corporate index, where cash balances are typically negative.

[13] LCS for US Corporate, Credit, and HY indices are available from January 2007; LCS for EM indices are available from February 2012, see Figure 24 in *LCS Report – May 2016*, Barclays Research, 6 June 2016.

FIGURE 12

Net cash balances of US IG Corporate and HY indices, February 2007 – March 2016

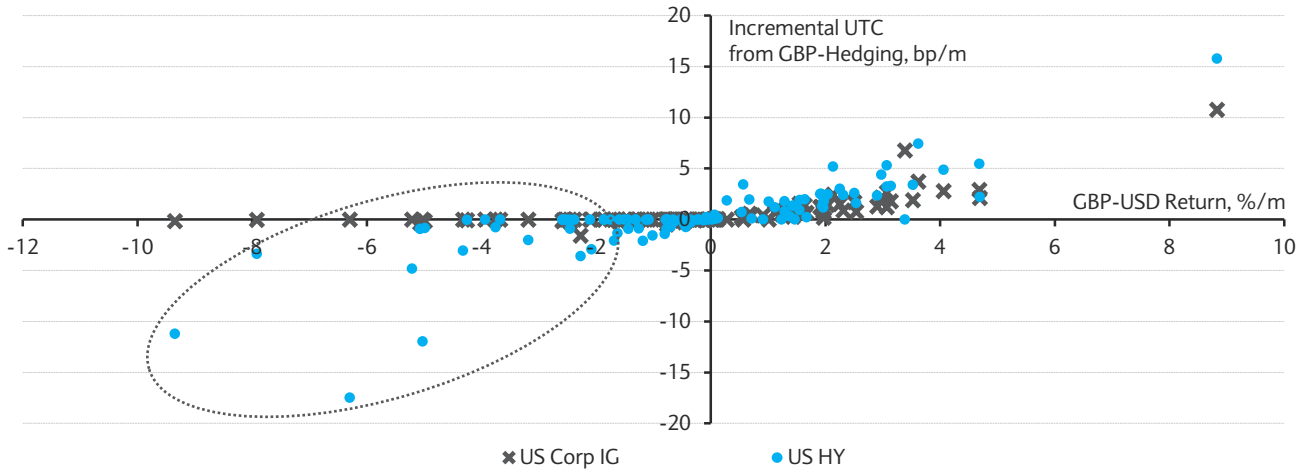


Source: Barclays Research

Figure 13 shows a scatterplot of monthly incremental UTC for US IG Corporate and HY indices versus dollar returns of GBP. In many instances, incremental UTC of the HY index becomes negative as a result of GBP depreciation relative to USD as positive cash balances of the index are redued by negative FX P/L.

FIGURE 13

Incremental UTC of US IG Corporate and HY indices induced by currency hedging versus GBP-USD spot returns, February 2007 – March 2016



Source: Barclays Research

Figure 14 reports average UTC from FX hedging for Euro and Sterling IG Corporate and HY indices hedged into G10 currencies between 2010 and 2016. The results are qualitatively similar to those of the US credit indices reported on Figure 10[14]. Interestingly, incremental UTCs from FX hedging the Sterling HY index into USD and CAD are negative, which means that negative P/L of FX hedging overlays for these two currencies has tended to reduce positive cash balances of the index. As a result, lower amounts had to be reinvested, which led to lower UTCs relative to the unhedged index. So, we observe that in rare circumstances when an index generates high positive net monthly cashflows, FX hedging can actually reduce UTCs.

[14] Please note that Euro and Sterling HY indices include newly issued bonds at Ask. This is in contrast with the US HY index, which includes newly issued bonds at Bid.

FIGURE 14

Incremental UTC from FX-hedging, Non-USD bond indices, bp/yr, June 2010 – March 2016

Base Currency	Euro Corporate IG bp/yr	Euro HY bp/yr	Sterling Corporate IG bp/yr	Sterling Corporate HY bp/yr
Local currency	EUR	EUR	GBP	GBP
Unhedged (UH)	4.1	32.4	6.5	66.1
		In Excess of UH Indices		
NZD	5.8	10.5	12.8	10.3
AUD	5.5	8.3	11.2	13.9
CHF	4.3	7.6	10.5	15.2
SEK	2.4	3.2	7.8	9.5
NOK	2.7	3.6	8.9	5.1
JPY	6.6	11.0	11.3	4.5
USD	5.3	7.9	9.1	-5.3
CAD	3.1	4.4	4.9	-2.5
GBP	3.6	4.5	-	-
EUR	-	-	6.1	1.2

Source: Barclays Research

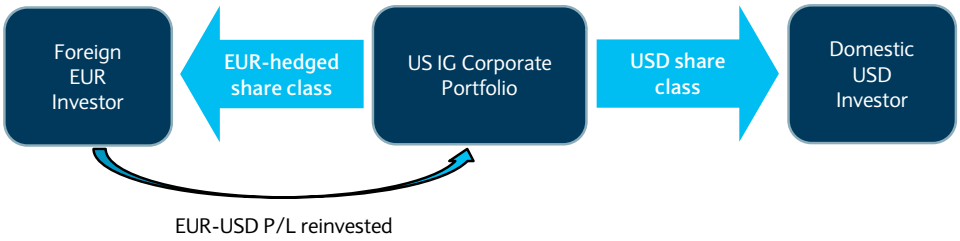
Sharing UTCs from FX hedging across investor types

Asset managers commonly pool foreign and domestic investors into a single fund. However, the share of the fund owned by foreign investors is typically currency-hedged, while the share owned by domestic investors is unhedged. For example, US and European investors in the US IG Corporate market are often pooled in the same US IG Corporate portfolio. Figure 15 illustrates this situation.

Portfolio returns for European investors are hedged into EUR using an overlay of EUR-USD forwards. Domestic USD investors, on the other hand, do not require currency hedging. Gains and losses from USD-EUR hedging get reinvested into the underlying portfolio and can lead to UTC performance drag relative to the index.

FIGURE 15

Foreign (EUR) and domestic (USD) investors pooled into a single US IG Corporate fund



Source: Barclays Research

From the operational standpoint it is difficult for the portfolio manager to properly attribute FX-hedging UTCs to individual investors in a pooled fund. In practice, any FX-hedging UTC is shared pro rata between USD and EUR investors, even though the former is unhedged. This can create a conflict of interest between foreign (hedged) and domestic (unhedged) investors in a pooled fund.

In addition, FX hedging-related UTC complicates manager evaluation. To the extent that a manager with many hedged investors is compared to other managers with less currency hedging, the FX hedging-related UTC performance drag can make the former manager appear to be an underperforming manager.

Reducing Incremental UTC Induced by Currency-Hedging

Managers can reduce FX hedging-related UTC in several ways. First, they can offer share classes of the same portfolio hedged into different currencies in order to diversify gains and losses from different currency overlays. FX hedging-related UTC should decline due to lower volatility of total FX overlay returns.

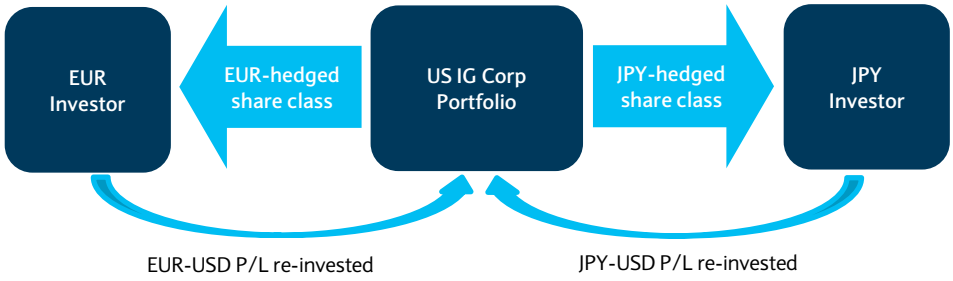
Second, managers can consider reinvesting gains and losses resulting from FX hedging overlays less frequently. As currency gains and losses tend to offset each other over time, induced UTC should on average decline. In principle, portfolio managers could even adopt alternative currency-hedged benchmarks that would not require frequent rebalancing of FX gains and losses, which would allow them to remain prudent with respect to UTC.

Finally, asset managers could use fixed income exchange traded funds (ETFs) to manage cash flows resulting from FX gains and losses. Being typically more liquid than the underlying cash bonds, ETFs could potentially help investors reduce FX hedging UTC. We consider these proposed remedies in detail.

Large asset managers can typically offer several currency-hedged share classes for a fixed income mandate. As an example, consider a US IG Corporate index investment offered in separate EUR and JPY hedged share classes. Figure 16 explains the concept. While the overall corporate portfolio is managed centrally, the portfolio manager issues hedged share classes for European and Japanese investors, with returns hedged respectively into EUR and JPY. The hedges would be typically implemented with 1-month currency forwards by selling USD versus EUR and JPY, respectively. FX gains (losses) of these currency overlays have to be reinvested into (covered by selling) the underlying portfolio.

FIGURE 16

US IG Corporate portfolio with EUR and JPY hedged share classes

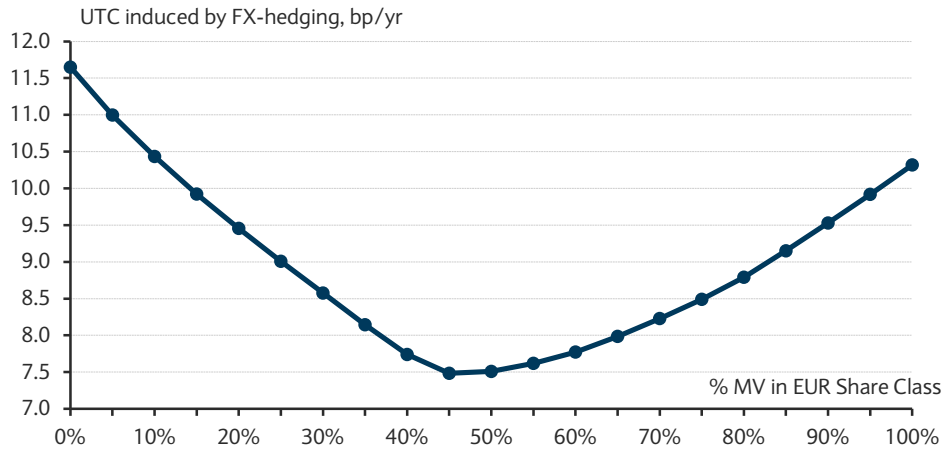


Source: Barclays Research

Because dollar returns of EUR and JPY are not perfectly correlated, gains and losses received from EUR and JPY overlays would tend to partially offset each other. For example, suppose the EUR appreciates (versus USD) while the JPY depreciates. The EUR "portfolio" will need to reinvest cash by buying bonds (incuring cost) while the JPY "portfolio" will need to sell the same bonds. For the portfolio as a whole, there is a natural netting of (some) of these transactions which could help reduce FX hedging-related UTC. This share class diversification between EUR and JPY, however, does not help if both foreign currencies appreciate versus dollar. In other word, the fund remains exposed to UTCs arising from idiosyncratic shocks in relative valuation of USD. Figure 17 shows FX hedging UTC as a function of percentage market value of the fund issued in EUR hedged share class.

FIGURE 17

USD IG Corporate mandate with EUR and JPY hedged share classes: Incremental FX hedging UTC versus % market value in EUR-hedged share class, February 2007 – March 2016



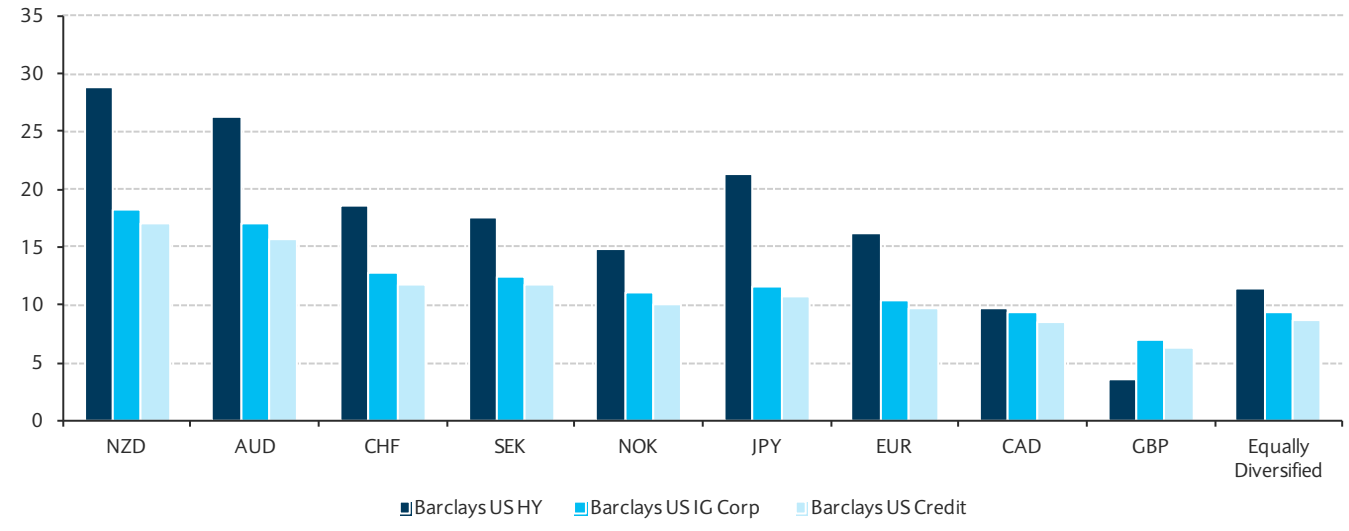
Source: Barclays Research

Incremental hedging-related UTC depends on the portfolio market value allocation between EUR and JPY hedge share classes. For portfolios exclusively hedged into JPY or EUR induced UTC were, respectively, 11.6bp/year or 10.3bp/year. However, when JPY and EUR share classes are combined in approximately equal proportions, induced UTC was reduced to 7.5bp/year on average for both JPY and EUR investors.

We can expand these results into other currencies and fixed income indices. Figure 18 measures average FX hedging UTC of US credit indices hedged into G10 currencies between 2007 and 2016. The figure incudes the results for individual currencies in isolation as well as for equally weighted share classes diversified across G10 currencies (excluding USD).

FIGURE 18

Average Incremental FX-hedging-related UTC for US bond indices, February 2007 – March 2016



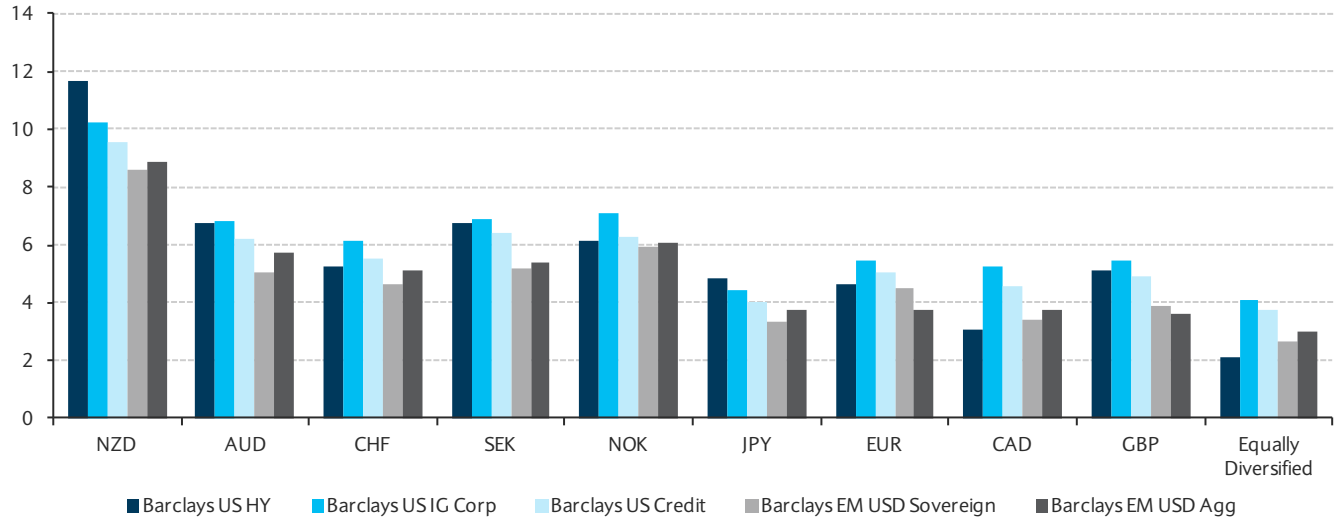
Source: Barclays Research

It seems that diversifying a portfolio across equally-weighted share classes can help reduce FX hedging-related UTC. Nevertheless, even these reduced incremental UTCs remain significant (around 10bp/year) and are comparable to or exceed incremental UTCs from hedging into low-volatility currencies (CAD and GBP). Figure 19 reports similar results over a more recent period (2012-2016) for a broader set of fixed income indices.

These results can, however, be difficult to achieve in practice since a fund manager cannot control the distribution of fund ownership across foreign investors. It is unlikely that the manager would be able to raise the same AUM from, say EUR and NZD investors.

FIGURE 19

Average incremental FX hedging-related UTC for US bond indices, February 2012 – March 2015

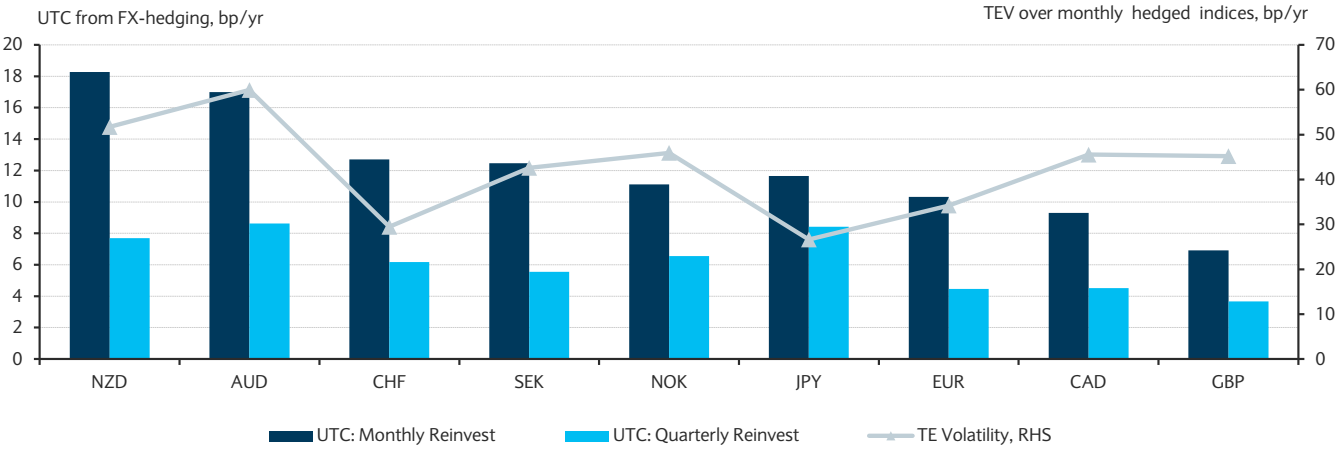


Source: Barclays Research

Another way to reduce FX hedging-related UTC is to reinvest FX gains and losses less frequently. Non-invested gains and losses offset each other over time (it may be a long, long time!), reducing net FX P/L amounts that must be reinvested in the index. Figure 20 shows the effect of reinvesting FX gains and losses quarterly (as opposed to monthly) on the average UTC of the US IG Corporate index hedged into G10 currencies. There are significant reductions in FX hedging-related UTCs.

FIGURE 20

Hedged US IG Corporate: Reinvesting gains and losses of FX overlay quarterly as opposed to monthly lowers induced UTC, but introduces TE volatility relative to the standard hedged indices, February 2007 – March 2016



Source: Barclays Research

Any FX hedging-related P/L not reinvested in the index accrues the short-term rate in the investor's base currency. Consequently, the portfolio can be under- or over-invested relative to the standard currency-hedged index, increasing tracking error volatility (TEV) risk.

The solid line on Figure 20 shows the annualized TEV of hedged US IG Corporate portfolios with quarterly reinvestment of FX P/L relative to the respective standard currency-hedged indices with FX P/L reinvested monthly. TEVs range between 30bp/yr and 60bp/yr depending on the investor's base currency.

Figures 21 and 22 summarize the effect of reducing re-investment frequency of FX P/L from monthly to quarterly for indices hedged into G10 currencies in 2007-2016 and 2012-2016.

FIGURE 21

Effect on Incremental FX-hedging UTC and TE from switching re-investment frequency of FX overlay P/L from monthly to quarterly, February 2007 – March 2016

	Barclays US IG Corp				Barclays US Credit				Barclays US HY			
	UTC-MM [bp/yr]	UTC-QQ [bp/yr]	Avg. TE [bp/yr]	TEV [bp/yr]	UTC-MM [bp/yr]	UTC-QQ [bp/yr]	Avg. TE [bp/yr]	TEV [bp/yr]	UTC-MM [bp/yr]	UTC-QQ [bp/yr]	Avg. TE [bp/yr]	TEV [bp/yr]
NZD	18.3	7.7	9.5	51.7	17.0	7.3	9.3	47.2	28.8	12.6	4.9	86.1
AUD	17.0	8.6	5.2	59.9	15.7	8.2	5.1	54.4	26.3	13.6	-16.2	97.6
CHF	12.7	6.2	0.3	29.5	11.8	5.8	0.5	26.1	18.6	9.4	-7.7	42.5
SEK	12.5	5.6	3.4	42.6	11.7	5.3	3.5	38.8	17.6	7.5	-12.3	70.4
NOK	11.1	6.5	11.7	45.9	10.1	6.2	10.6	42.1	14.9	9.9	-11.8	76.2
JPY	11.6	8.4	-23.9	26.6	10.7	7.8	-22.4	24.6	21.4	17.4	-17.2	47.3
EUR	10.3	4.5	4.2	34.2	9.7	4.3	4.6	31.0	16.2	5.5	-7.6	57.2
CAD	9.3	4.5	8.3	45.5	8.6	4.2	8.0	41.8	9.7	3.7	-9.4	76.9
GBP	6.9	3.7	7.4	45.2	6.2	3.4	7.2	40.9	3.5	3.4	-1.3	68.7

Source: Barclays Research

FIGURE 22

Effect on Incremental FX-hedging UTC and TE from switching re-investment frequency of FX overlay P/L from monthly to quarterly, February 2012 – March 2016

	Barclays US Treasury			Barclays US IG Corp			Barclays US Credit			Barclays EM USD Sov			Barclays EM USD Agg			Barclays US HY		
	% Chg in TC	Avg. TE bp/yr	TEV bp/yr	% Chg in TC	Avg. TE bp/yr	TEV bp/yr	% Chg in TC	Avg. TE bp/yr	TEV bp/yr	% Chg in TC	Avg. TE bp/yr	TEV bp/yr	% Chg in TC	Avg. TE bp/yr	TEV bp/yr	% Chg in TC	Avg. TE bp/yr	TEV bp/yr
NZD	-46%	2.8	9.2	-47%	1.5	12.5	-47%	1.0	12.1	-44%	4.5	22.3	-41%	3.6	22.3	-39%	5.6	20.9
AUD	-45%	1.3	7.9	-50%	-1.4	12.9	-49%	-2.2	12.9	-50%	-5.6	24.6	-52%	-7.1	24.6	-41%	-4.4	19.1
CHF	-50%	5.4	7.6	-54%	4.6	7.6	-53%	4.2	7.4	-56%	0.9	14.4	-53%	-2.6	14.4	-57%	-8.1	15.9
SEK	-47%	1.3	6.4	-55%	0.9	7.7	-57%	0.7	7.5	-59%	2.8	17.3	-58%	0.9	17.3	-55%	-1.8	15.7
NOK	-51%	5.6	6.4	-51%	5.4	7.6	-51%	4.8	6.9	-56%	0.5	17.1	-57%	-4.3	17.1	-58%	-5.9	15.3
JPY	-36%	-5.6	7.3	-44%	-16.1	14.0	-46%	-15.8	13.6	-39%	-30.6	24.0	-48%	-27.8	24.0	-60%	-20.4	19.7
EUR	-44%	0.6	6.9	-48%	2.3	7.2	-46%	2.3	7.1	-50%	9.2	14.3	-40%	7.8	14.3	-49%	2.7	14.6
CAD	-43%	1.1	8.2	-51%	0.1	8.0	-51%	0.0	7.6	-50%	3.5	13.4	-55%	0.8	13.4	-62%	-0.5	17.0
GBP	-36%	2.6	5.0	-39%	6.4	9.1	-39%	5.8	8.5	-34%	3.9	13.5	-32%	3.4	13.5	-44%	8.4	15.0

Source: Barclays Research

Changing the rebalancing frequency of FX hedging-related P/L significantly reduces UTC. However, quarterly rebalancing introduces tracking errors relative to standard currency-hedged benchmarks, which sometimes can be significant. Average TE can be negative or positive depending on the correlation between index and currency returns. For example, the average TE of indices hedged into JPY are predominantly negative because currency gains for the JPY hedge typically occur during market drawdowns. As a result, investor portfolios tend to be "underinvested" prior to a market recovery. Similarly, average tracking errors are typically negative for quarterly hedged HY indices, reflecting opportunity costs of quarterly reinvestment.

Investors who assign a higher importance to lowering turnover and associated transaction costs of their portfolios, could potentially adopt alternative currency-hedged benchmarks that reinvest their FX hedging-related P/L on a less frequent basis.

Finally, we consider using fixed income exchange traded funds (ETFs) in order to reduce costs of managing cash flows resulting from FX hedging overlays. Instead of reinvesting currency gains into the underlying portfolio, an asset manager can buy ETF shares that provide a similar exposure to the underlying market. We cover two ETFs in our analysis: iShares iBoxx IG Corporate ETF (LQD) and iShares iBoxx USD HY ETF (HYG).

LQD and HYG are designed to track the investment results of indices respectively composed of dollar-denominated IG and HY corporate bonds[15]. In our case, we use them as close substitutes for Barclays USD IG Corporate and HY indices whenever FX hedging gains need to be reinvested. The two ETFs are very liquid with percentage Bid-Ask spreads varying around 0.02[16]. These highly liquid instruments can be used by asset managers to reduce performance drag associated with rebalancing UTC induced by currency hedging[17]. We should, however, point out that large ETF trade sizes typically have significantly larger Bid-Ask spreads. Nevertheless, fixed income ETFs may be a lower cost option for reinvesting FX hedging gains rather than into the underlying index bonds.

We allow FX hedging gains to be invested in an ETF with maximum allocation capped at 10% of portfolio market value. FX hedging losses are covered by selling ETF shares or, if the allocation to an ETF reaches zero, bonds from the underlying portfolio. Figure 23 summarises the effect of using ETFs for managing cash flows resulting from FX hedging overlays on UTCs of currency-hedged USD IG Corporate and HY indices in the period between 2012 and 2016[18].

FIGURE 23

Effect on Incremental FX-hedging UTC and TE from using fixed income ETFs to manage currency cashflows, February 2012 – March 2016

	Barclays US Corp IG				Barclays US HY			
Base Currency	UTC [bp/yr]	UTC-LQD [bp/yr]	Avg. TE [bp/yr]	TEV [bp/yr]	UTC [bp/yr]	UTC-HYG [bp/yr]	Avg. TE [bp/yr]	TEV [bp/yr]
NZD	10.3	1.6	4.5	17.5	11.7	-1.6	0.7	19.7
AUD	6.8	0.0	5.8	14.0	6.8	-4.3	3.3	17.2
CHF	6.2	0.0	2.1	12.8	5.3	-3.0	-0.9	12.8
SEK	6.9	0.5	0.4	14.3	6.8	-2.8	-4.4	15.5
NOK	7.1	0.3	-1.6	11.9	6.1	-2.8	1.3	11.1
JPY	4.4	0.0	1.6	4.1	4.8	-2.4	-3.1	10.2
EUR	5.5	0.2	-1.7	14.1	4.7	-2.8	-3.3	15.7
CAD	5.2	0.0	0.6	7.4	3.0	-3.5	2.7	7.6
GBP	5.5	0.3	2.5	10.4	5.1	-1.4	0.7	15.1

Source: Barclays Research

Using ETF allocation significantly reduces UTC for currency-hedged US IG Corporate index. In the case of the US HY index, incremental FX hedging-related UTC become negative as FX losses can help reduce the typical positive cash balances of the index, while FX gains are reinvested into HYG.

[15] LQD and HYG are designed to track Markit iBoxx USD Liquid IG and HY indices, respectively.
[16] LQD and HYG charge annual management fees of 15bp and 50bp respectively. These fees are reflected in reported performance numbers.
[17] We recognize that some fixed income mandates would not allow portfolio managers to use ETFs.
[18] Bid-ask spreads for LQD and HYG are available from January 2012.

Conclusion

Standard currency-hedged benchmarks assume FX overlay gains (and losses) are essentially reinvested (dis-invested) into the underlying index at no incremental cost to index performance. In contrast, for a portfolio manager this FX hedging-related rebalancing activity leads to incremental rebalancing costs, called uncompensated rebalancing costs (UTC), and are a real source performance drag relative to the index.

In addition, these incremental FX hedging-related UTCs are shared pro-rata among portfolio owners, including unhedged domestic investors. This unnecessarily penalises unhedged investors and, therefore, creates a potential conflict of interest between domestic and foreign clients of an asset manager. FX hedging-related UTC also complicates relative manager performance evaluation.

We quantified FX hedging-related UTCs for several fixed income indices hedged into G10 currencies and showed that the resulting performance drag can be significant, especially during market stress.

A positive correlation between currency returns and changes in liquidity costs, as in the case of "safe haven" currencies, increases FX hedging-related UTC.

We have shown that investors can reduce FX hedging-related UTC by adopting benchmarks with infrequent reinvestment of currency gains and losses.

Finally, liquid instruments, such as fixed income ETFs, can also be employed to manage FX overlay gains and losses less expensively.

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