Bloomberg Mirror Futures and Duration Hedged Indices

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Introduction to Bloomberg Mirror Futures and Duration Hedged Benchmark Indices

Mirror Futures Indices (MFI) and **Duration Hedged Indices (DHI)** are used by investors seeking to adjust the duration of their fixed income benchmarks while preserving the broad coverage and diversification of their existing fixed income investment set. An MFI is a basket of Treasury futures contracts designed to match the duration exposure of a Bloomberg Index. A DHI combines a cash index with a short MFI position, so as to reduce the Treasury duration exposure of the cash index. These new indices may be used as replacements for existing portfolio benchmarks, reference indices for various replication strategies, or informational measures of interest rate duration-hedged (fully or partially) bond market returns.

- **Mirror Futures Index**: An MFI is an index whose return reflects a funded set of Treasury futures contracts, weighted so as to match closely the beginning-of-the-month option-adjusted duration (OAD) profile of an underlying standard bond index. For example, the US Aggregate MFI will include five US Treasury futures contracts weighted to match the OAD profile and market value of the cash US Aggregate Index, plus a cash investment (a "funding component") in US T-bills. We chose to include a funding component in the MFI to make its returns more comparable with those of a traditional cash index, which assumes a funded investment in the index bonds.
- **Duration Hedged Index**: A funded index whose return reflects the return on the underlying cash index, with its OAD exposure hedged (fully or partially) using its MFI. For example, the US Aggregate DHI is the US Aggregate less its MFI, plus the MFI's funding component added back.

MFI and DHI returns will be available on currency unhedged and hedged bases. We publish them for select standard Bloomberg Indices, but the methodology discussed in this publication can be applied to almost any standard or customized Bloomberg Index. Current coverage includes:

- **USD Indices**: US Aggregate Index, US Government/Credit Index, US Credit Index, US Corporate Index, US Treasury Index, US Fixed-Rate MBS Index, and US TIPS Index (Series-L).
- **Global Indices**: Global Aggregate Index, Global Corporate Index, Global Aggregate x-USD Index, Global Aggregate Ex-JPY Index, Global Corporate Ex-USD Index, Global Corporate Ex-JPY Index, Global Treasury Index, and Global Credit Index.
- **Pan Euro Indices**: Euro Aggregate Index, Euro Corporate Index, Sterling Aggregate Index, and Sterling Corporate Index.

Clients seeking an index that retains some interest rate duration exposure can also request a DHI that scales back the degree of duration hedging but does not fully hedge it. For example, a client may prefer to remove 50% of the duration exposure of the US Aggregate and request a US Aggregate 50% DHI. Additionally, constant duration benchmarks (e.g., a US Aggregate Duration of 3 Index) can be created using the MFI/DHI methodology.

Duration Hedged Indices: Motivation and Overview

Benchmark without Treasury term structure exposure while continuing to capture spread carry and spread change components of returns, alleviating potential worries on Treasury yield increases

Exposure to the Treasury yield curve is a dominant driver of total returns for most fixed-income indices. For example, the US Aggregate Index posted year-to-date total return of 8.52% (as of 30 September 2019) with reported excess (spread) return of 1.11%, which implies curve return of 7.41% (total return minus the excess return).

In some circumstances, there may be a preference for a standard index with its Treasury term structure return component removed. These are the DHI. For example, those worried about increases in Treasury yields may want a benchmark without Treasury term structure exposure while continuing to capture spread carry and the spread change component of returns.

Advantages of a DHI vs. a Shorter-Maturity Cash Index

A potential option to mitigate duration risk could simply be to change to a shorter duration standard benchmark, say, move from the US Aggregate to the 1-3y US Aggregate. However,

there are certain advantages to a DHI. First, it will target a zero duration, whereas the 1-3y Aggregate still has meaningful Treasury duration exposure (2.48y as of 30 September 2019).

Second, a DHI does not disrupt the existing portfolio management process. A portfolio manager who was originally managing against the US Aggregate can continue to do so, with the same broad range of index issues from which to select (approximately 10,900 in the Aggregate vs. 2,200 in the 1-3y Aggregate), the same ability to overweight/underweight duration, and the same ability to overweight/underweight sector allocation and spread duration. In addition, with a DHI, the asset owner, presumably happy with the manager's performance, can continue to profit from the manager's full set of skills while knowing that the Treasury baseline duration of the portfolio is approximately zero. The asset owner does not have to search for a new short-duration manager. Similarly, the investment manager can avoid losing satisfied, but duration-concerned, clients to other low duration or alternative products (e.g., cash or equities).

Third, DHI returns contain the tracking error of using a basket of Treasury futures (i.e., the MFI) to remove an index's return component arising from changes in the Treasury curve. For the Treasury sector of an index, the Treasury component of return is that on the bonds themselves. However, for non-Treasury bonds, the index defines this component as the return on a KRD-matched portfolio of hypothetical par Treasury bonds. Depending on the set of available Treasury futures and the stability of the cash-futures basis, there is bound to be some tracking error between the return on the duration-matched futures basket and the index's Treasury component of returns.

For investment managers, the advantage of a DHI benchmark is that any tracking error between futures and the index Treasury component of return is part of the benchmark's return. The manager is not responsible for how well the futures track the Treasury component of returns. Instead of specifying a benchmark duration and making the manager bear the tracking error of adjusting an index to a client's target duration, the DHI benchmark will reflect that change. This means that as long as the Aggregate manager mimics the futures basket overlay in the DHI, his or her performance can continue to be measured cleanly versus the Aggregate index, while the asset owner enjoys a benchmark with its desired duration but bears the tracking error volatility arising from using futures to reduce duration.

DHI Design Overview

An MFI does not synthetically replicate the total returns of a cash index, only the Treasury component of the returns.

As discussed, to construct a DHI, we must first identify and remove the Treasury component of a cash index's return. To do so, we use the MFI for the cash index. MFIs build on a long history of research on index replication using futures and are similar in concept to our Mirror Swap Indices.

An MFI does not synthetically replicate the total returns of a cash index, only the Treasury component. It holds a funded (using T-bills) basket of Treasury futures contracts weighted to match the Treasury OAD exposure of the underlying cash index. The MFI futures basket is rebalanced monthly, just like the underlying cash bond index. As we will show, an MFI follows a straightforward construction methodology and is easily replicable.

A DHI is defined as the total return on the underlying cash index less the return of its corresponding MFI, with the MFI funding component added back. A DHI is a funded index, just like its underlying cash index. However, since the MFI is also a funded index, subtracting its return from the cash index return would make the DHI an unfunded index. This is why we add back the MFI funding component of return to the DHI. Without this, the DHI should closely track the reported excess returns of the cash index, which are calculated as the difference between two funded returns (the index return and the duration-matched Treasury portfolio return).[1]

[1] Reported index excess returns equal the return difference between the cash index and a portfolio of hypothetical Treasury bonds that match the KRD exposure of the index. Since the cash index and the duration-matched Treasury portfolios are both funded, the excess return is an unfunded return.

Other Uses for Mirror Futures Indices

The MFI design makes it a prime candidate as a reference index for access/replication products.

In addition to its use to construct a DHI, an MFI is also a reference index on its own for access/replication products. For example, in total return swap form, a manager could receive/pay the total return on the replicable MFI basket (and pay/receive a short funding rate (e.g., 1m Libor +/- a spread). Portfolio managers may find such swaps, which relieve them from having repeatedly to size the individual futures positions and rebalance, to be particularly useful. For example, a TIPS manager wishing to make an explicit breakeven view, without the nominal term structure exposure, could overlay a pay-TIPS MFI swap on his or her cash TIPS index portfolio. Or a hedge fund could combine its alpha return with a receive-Aggregate MFI swap to compete for traditional FI mandates. Similarly, a credit fund could overlay its credit alpha on a receive-Credit MFI swap to compete for corporate mandates.

We first present the MFI methodology, an intuitive and rules-based approach for matching duration exposure. For several cash indices, we then show how well an MFI has been able historically to track the Treasury component of an index's returns. We then illustrate the DHI construction process and show how DHI returns (adjusted for funding) have tracked the underlying cash index's excess returns.

Mirror Futures Index (MFI) Methodology

We first describe the MFI construction process for a single currency domestic index (e.g., the US Aggregate). Then we describe MFI construction for global indices containing multiple currencies (e.g., the Global Aggregate).

Bloomberg MFIs are designed to be straightforward and intuitive for a wide variety of investors, while remaining flexible and adaptable enough to offer bespoke solutions to meet an investor's specific constraints, preferences, or guidelines. As such, the underlying index mechanics and methodology adhere to design principles required for any good benchmark:

- **Representative** of the market being measured and the desired risk exposures of its users;
- **Replicable**, without unnecessary turnover and transaction costs; and
- **Objective and transparent**, with clearly defined and objective rules and visibility into current index composition and future composition during rebalancing periods.

MFI Construction and Returns for a Single Currency Index

1. Index OAD bucketing and futures contract selection

MFI construction starts with sorting the underlying cash bond index (Projected Universe) at the beginning-of-the-month (BOM) into various non-overlapping OAD buckets. OAD refers to the option adjusted analytical treasury duration, as computed and reported by Bloomberg index analytics.

- For an index containing bonds denominated in a single currency, each available and liquid treasury futures contract (front-month contract in the quarterly cycle) is assigned to one (and only one) OAD bucket.[2]
- The underlying single currency cash index will be divided into OAD buckets depending on the number of available contracts in the currency. Breakpoints are selected so that the OAD of each bucket is close to that of its matching futures contract and there is a non-trivial amount of index market value in the bucket.

[2] An index's OAD bucketing scheme will remain constant unless there are dramatic changes in a futures contract deliverable or the availability of new liquid futures contract markets.

2. Weight Calculations – Single Currency MFI

We then calculate the market equivalent value of futures contracts needed in the MFI so as to match the contribution to the OAD of the futures position with that of the corresponding index's OAD bucket.[3]

- For each eligible futures contract, we use Bloomberg analytics for its estimated treasury duration exposures.[4] These are computed in a manner consistent with Bloomberg's duration calculation for cash bonds.
- The MFI weights are then fixed for the ensuing month.
- At the next monthly rebalancing, we repeat this exercise. If the next month is the futures contracts' expiration month, we roll the futures contracts to the next quarterly expiration month. For example, a contract expiring in December will be rolled to the contract expiring the following March at the end of the last business day of November.

Example: US Aggregate MFI

- For USD-denominated indices, we have identified five liquid Treasury futures contract markets (TU, FV, TY, US, and WN)[5]. Figure 1 shows the OAD break points for each of these contracts and the total market value and market-value weighted OAD for each OAD bucket of the US Aggregate (Projected Universe) as of the last business day in September 2019.

Figure 1
US Aggregate Mirror Futures Index Constituents, 30 September 2019

Bucket	Index OAD	MV ($mn)	MV %	Cont. to OAD	Futures Contract	Futures OAD	MFI Weight
Total	5.776	23,144,356	100.00%	5.776			
OAD 0-3y	2.044	9,051,448	39.11%	0.799	TUZ9	1.903	42.00%
OAD 3-5y	3.840	6,012,604	25.98%	0.997	FVZ9	4.185	23.83%
OAD 5-7.5y	6.162	3,070,685	13.27%	0.818	TYZ9	6.402	12.77%
OAD 7.5-15y	10.625	2,350,339	10.16%	1.079	USZ9	12.518	8.62%
OAD 15y+	18.123	2,659,279	11.49%	2.082	WNZ9	18.954	10.99%
					US T-bills Stub Position		1.79%
							100.00%

Note: each futures contract's weight is a funded position, where principal is invested at the same weight in short maturity US T-bills
Source: Bloomberg

- The US Aggregate Index (Projected Universe) had 39.11% of its market value in the 0-3y OAD bucket (as of 30 September 2019).
- The OAD of this index bucket was 2.044, for a contribution to OAD of 0.799. We assign the 2y Treasury futures contract (TU) to this bucket. We use December expiration futures contracts up until the end of November.
- Since the contract had an estimated OAD of 1.903, the MFI needs a market equivalent value percentage weight in the futures contract (i.e., futures price × # of contracts × notional size of the futures contract / market value of cash index) so that the contribution to OAD of the futures position matches that of the index's 0-3y OAD bucket.
- As of 30 September 2019, the weight of the 2y futures contract position in the US Aggregate

[3] A futures position at initiation has no market value. So to measure the contribution to OAD of a futures position, we use its hypothetical market value (or, its market equivalent value). A futures position's market equivalent value equals the futures price multiplied by the contract size. For example, the contract size for the US Treasury bond futures contract is $100,000. If the futures price is 112-00, then the market equivalent value of one futures contract is assumed to be $112,000. If the OAD of the futures contract were 9.0 and there was a 10bp increase in the yield of the underlying bond, then the estimated market equivalent value of the contract would decline to $110,992.
[4] Prior to August 16, 2018, Barclays POINT® analytics were used for futures contracts. Prior to October 2013, we used the sum of the futures KRDs to estimate the OAD for the futures contract for data completeness.
[5] These are Bloomberg tickers. For historical analysis, the relatively new Ultra-Long futures contract market was not added to the MFI until January 2010.

MFI was 42.00%:

$$MFI_{TUZ9\ weight} = ContrOAD_{OAD\ 0\text{-}3y\ bucket} / OAD_{2y\ futures}$$
$$= 0.799 / 1.903$$
$$= 0.4200$$

- Each futures position in the MFI is a funded position. In other words, the market equivalent value weight of each futures position in an MFI is paired with an identical market value weight investment in short-maturity Treasury bills. [6] Consequently, 42.00% of the US Aggregate MFI's market value weight, corresponding to the 39.11% market value weight of the 0-3y OAD bucket of the US Aggregate, contains long positions in TUZ9 futures contracts and short-maturity Treasury bills.[7]
- We repeat this exercise for all OAD buckets. If the market value weights of the five MFI positions do not sum to 100%, we then add/subtract a "stub" investment in short-maturity Treasury bills, with an assumed OAD of zero, so that not only does the duration of the MFI equal that of the index, but also that the market value percentages of all MFI positions sums to 100%.

3. Return Calculations and Funding Assumptions – Single Currency MFI

- The month-to-date return of an MFI futures position is a price return calculated by dividing the current closing futures price by the BOM closing futures price, and subtracting 1.[8] This is the percentage P&L (mark-to-market) per futures position, to which we refer as the "unfunded" futures return, as there is no initial cash investment.
- To this unfunded return we then add the MTD return on the short-maturity Treasury bill position to arrive at a MTD "funded" total return for this futures position. These funded returns are then summed across the MFI futures positions, using the BOM MFI weights, to compute the MTD MFI total return (Figure 2).
- We chose to make the MFI a funded index to be similar to our usual family of indices, as well as our mirror swap indices. Also, subtracting the MFI from its cash index produces an excess return that can be directly compared with our reported index excess returns.

Figure 2
Month-to-Date US Aggregate MFI Total Return, 31 October 2019

Futures			Funding (T-bills)	
Contract	Weight	MTD Return (%)	Weight	MTD Return (%)
TUZ9	42.00%	0.047	42.00%	0.156
FVZ9	23.83%	0.046	23.83%	0.156
TYZ9	12.77%	-0.012	12.77%	0.156
USZ9	8.62%	-0.578	8.62%	0.156
WNZ9	10.99%	-1.124	10.99%	0.156
Stub Position			**1.79%**	**0.156**
		MTD MFI Return	**100.00%**	**0.012**

Note: Weights of the unfunded futures positions do not necessarily sum up to 100%.
Source: Bloomberg

MFI Construction for a Multi-Currency Index

The basic design for an MFI on a multi-currency benchmark index follows that of a single currency index. However, to hedge the interest rate exposure of local currency debt markets that do not have active futures markets, further adjustments need to be made.

1. Index OAD bucketing and futures contract selection

Local Currency Mappings to Markets with Liquid Futures Contracts

The Global Aggregate Index contains 28 different currencies (as of August 24, 2021).[9] However, only a few of these have liquid Treasury futures contracts. To construct an MFI for multi-currency indices, we map the market value of a "non-futures" currency to a "futures" currency (i.e., a currency with a liquid Treasury futures market).

- We identify six currencies with liquid Treasury futures markets: the USD, GBP, JPY, CAD, AUD and EUR.[10] Figure 3 identifies the mapping of "non-futures" currencies to "futures" currencies for the standard Global Aggregate MFI.[11] Figure 4 provides details of the Global Aggregate MFI market value mapped from "non-futures" currencies to the six "futures" currencies as of 30 September 2019.[12]
- Approximately 6.8% of the Global Aggregate's market value is mapped to a non-native currency (as of 30 September 2019).[13]

Figure 3
Currency Mapping of "Non-futures" Currencies to "Futures" Currencies for the Global Aggregate MFI

"Futures" Currency		Mapped Global Agg Eligible "Non-Futures" Currency
USD	←	CLP, COP, MXN, PEN
EUR	←	CHF, CZK, DKK, HUF, ILS, NOK, PLN, RON, RUB, SEK
JPY	←	CNY, HKD, IDR, KRW, MYR, SGD, THB
AUD	←	NZD
CAD		
GBP		

Source: Bloomberg

Figure 4
Currency Mapping Details from "Non-futures" Currencies to "Futures" Currencies, Global Aggregate MFI, 24 August 2021

"Futures" Currency	Currency	MV% in Global Aggregate	MV% of "Futures" Currency in Global Aggregate
USD	**USD**	**45.44%**	**45.79%**
	CLP	0.06%	
	COP		
	MXN	0.28%	
	PEN		
EUR	**EUR**	**23.59%**	**25.53%**
	CHF	0.54%	
	CZK	0.09%	
	DKK	0.23%	
	HUF	0.08%	

[6] Presently we use a composite index of short maturity Treasury bills to represent the funding component of the MFI. If Treasury bills are not available, we use short maturity LIBOR or deposit rates.
[7] We assume the short-maturity Treasury bill position has zero duration.
[8] The closing futures price is the Exchange's official 2pm (local time) closing price. Unlike our swap index returns, the futures return does not subtract 1bp/m.
[9] Though broad-based in its coverage of local currency debt markets, ~92% of the overall universe is denominated in USD, EUR, JPY, GBP, or CAD on a market value weighted basis.
[10] Any new local currency debt markets that are added to the Global Aggregate through the annual index governance review will be mapped at that time with Americas mapping to USD, EMEA mapped to EUR, and Asia mapped to JPY. Additional non-investment-grade local currency EM markets would follow a similar mapping.
[11] This currency mapping is the same as that for our standard Replicating Bond Index (RBI) baskets.
[12] We assume that an investor excluding a specific local currency bond market from a cash bond index does not want any exposure to that same futures market arising from currency mapping. Therefore, if the underlying cash bond index excludes one of the four futures currencies that have other currencies mapped to it (USD, EUR, JPY, and AUD), we re-map to another futures currency. The market value of Global Agg currencies mapped to JPY, EUR, and AUD will be remapped to USD if those underlying futures currencies are not benchmark eligible. Currencies mapped to USD will be remapped to EUR.
[13] Because many issuers borrow in non-native hard currencies, the mapping of issuer country of risk to futures is less close, including non-Germany Eurozone countries that are mapping to German futures (e.g., France's 5.4% market value weight is mapped to the EUR futures contract markets). Only 65.6% of the Global Aggregate market value (30 September 2019 – Projected Universe) is mapped to a country whose treasury instruments underlie the treasury futures contract markets for its currency.

	ILS	0.13%	
	NOK	0.10%	
	PLN	0.20%	
	RUB	0.17%	
	SEK	0.41%	
JPY	**JPY**	**15.82%**	**20.24%**
	CNY	2.08%	
	HKD	0.02%	
	IDR	0.31%	
	KRW	1.16%	
	MYR	0.29%	
	SGD	0.19%	
	THB	0.36%	
AUD	**AUD**	**1.20%**	**1.31%**
	NZD	0.11%	
GBP	**GBP**	**4.56%**	**4.56%**
CAD	**CAD**	**2.58%**	**2.58%**

Source: Bloomberg

Selecting Eligible Contracts for Each Futures Currency

- Figure 5 shows the specific futures contracts selected for the six "futures" currencies used in Global Aggregate MFIs.[14] In total, we use 14 different futures contracts for the Global Aggregate: five for USD[15]; four for EUR; two for AUD; and one each for GBP, JPY, and CAD. The number of contracts for each "futures" currency equals the number of duration buckets applied to the corresponding underlying cash bond index component of the Global Aggregate.
- While some "futures" currencies have additional Treasury futures contract markets, trading volume and open interest are often too low and are therefore not selected to be a constituent of an MFI.
- We map only the market value of the "non-futures" currency to the "futures" currency. For example, we add the "non-futures" NZD market value to the "futures" AUD market value. We do not map the OAD profile of the NZD market to the OAD profile of the AUD market. Effectively, both the AUD market value and term structure in the MFI are augmented by the NZD market value.

[14] The list of eligible futures contracts and mapping of non-futures currencies is governed and reviewed annually (as of 31 May each year) by the Bloomberg Index Group. Any changes to the eligible contract list or currency mappings will be announced on INP <Go> and take effect as of the 30 June rebalancing for all MFI. Eligible contracts and new contract candidates are evaluated on a case-by-case basis for their relative liquidity and investability using metrics including but not limited to trading volume and open interest. In between annual rebalancing dates, the Bloomberg Index group may remove or replace an existing contract if there has been a sustained market disruption or impairment to liquidity that affects an investor's ability to replicate, particularly in a roll month. Any substitutions based on market disruptions will be announced on INP <Go> and made at the ensuing month-end rebalancing with a minimum of five business days' notice.
[15] The Ultra-Long USD futures contract was used beginning in February 2010. Prior to that date, we used only four contracts/buckets with all exposure in the 7.5y+ bucket mapping to the Long Bond futures contract.

Figure 5
Eligible Contracts for each "Futures" Currency, 30 September 2019

Currency	Bloomberg Id	Futures Contract Market Description	Open Interest	Assigned Duration Bucketing
USD				
	TUZ9	2y Treasury Note	3,658,352	0-3y
	FVZ9	5y Treasury Note	4,149,985	3-5y
	TYZ9	10y Treasury Note	3,580,823	5-7.5y
	USZ9	30y Treasury Bond	971,388	7.5-15y
	WNZ9	Ultra-Long Treasury Bond	1,139,701	15y+
EUR				
	DUZ9	Euro Schatz	1,432,903	0-3y
	OEZ9	Euro Bobl	1,073,740	3-6y
	RXZ9	Euro Bund	1,392,674	6-13y
	UBZ9	Euro Buxl	221,330	13y+
JPY				
	JBZ9	10y JGB	99,891	
GBP				
	G Z9	Long Gilt	636,088	
AUD				
	YMZ9	3y T-Bond	1,139,844	0-3y
	XMZ9	10y T-Bond	1,303,368	3y+
CAD				
	CNZ9	10y Canadian Gov't Bond	571,131	

Source: Bloomberg, CME, EUREX, TSE, NYSE EURONEXT (LIFFE), ASX, and TMX

Funding Instruments for "Futures" Currencies

For the six "futures" currencies, we identify their short-maturity funding instruments.

- For the G4 currencies (USD, EUR, GBP, JPY), we represent these funding instruments with short-term treasury bills issued by the corresponding countries.[16] For the "futures" currency AUD, we use the 1m AUD deposit rate. For CAD, we use the Canada Bankers Acceptances 1m rate. Figure 6 shows the current funding definition for each of the six "futures" currencies.

Figure 6
Funding Definition for Each "Futures" Currency in the Global Aggregate MFI

"Futures" Currency	Funding Instrument
USD	US short-term treasury bills
EUR	German short-term treasury bills
GBP	UK short-term treasury bills
JPY	Japan short-term treasury bills
CAD	Canada Bankers Acceptances 1m rate
AUD	Australian 1m deposit rate

Source: Bloomberg

[16] The T-Bill universe used for this calculation is a rules-based index that may include one or more securities and is designed to achieve a target maturity of 1m, while ensuring that there is at least one eligible security for the length of the index history. Some investors may prefer a single, large on-the-run T-Bill issue to be used over a 1m T-Bill basket for replication purposes. This is being evaluated as a potential future enhancement, but is not available as of the index launch. Any futures changes to the funding assumptions will be made on a forward basis and announced in advance.

2. Weight Calculations for Multi-Currency Index

Having identified the six "futures" currencies, their liquid futures contracts, the OAD bucketing scheme of the cash index for each currency, and the futures funding definition, Figure 7 show the constituents and weighting mechanics (which follow a similar approach to that used in the single currency index) of the Global Aggregate MFI as of 30 September 2019.

Figure 7
Global Aggregate MFI Constituents, 30 September 2019

Cash Index					Mirror Futures Index		
USD Mapped	**OAD bucket**	**Currency Bucket MV%**	**Glob Agg MV%**	**OAD**	**Eligible Futures**	**Futures OAD**	**Weight**
	OAD 0-3y	38.54%	17.65%	2.04	2y	1.90	18.98%
	OAD 3-5y	25.84%	11.83%	3.85	5y	4.19	10.90%
	OAD 5-7.5y	13.95%	6.39%	6.18	10y	6.40	6.14%
	OAD 7.5-15y	10.62%	4.86%	10.65	30y	12.52	4.07%
	OAD 15y+	11.05%	5.06%	18.04	Ultra	18.95	4.85%
			45.79%		USD T-bills (stub)		0.86%
EUR Mapped	**OAD bucket**	**Currency Bucket MV%**	**Glob Agg MV%**	**OAD**	**Eligible Futures**	**Futures OAD**	**Weight**
	OAD 0-3y	23.11%	5.90%	2.00	Euro Schatz	1.95	5.90%
	OAD 3-6y	31.07%	7.93%	4.46	Euro Bobl	4.81	7.33%
	OAD 6-13y	31.16%	7.95%	8.54	Euro Bund	8.86	7.76%
	OAD 13y+	14.66%	3.74%	19.08	Euro Buxl	20.74	3.52%
			25.53%		DEM T-bills (stub)		1.03%
GBP	**OAD bucket**	**Currency Bucket MV%**	**Glob Agg MV%**	**OAD**	**Eligible Futures**	**Futures OAD**	**Weight**
	OAD	100%	4.56%	11.86	Long Gilt	8.51	6.35%
					GBP T-bills (stub)		-1.79%
JPY Mapped	**OAD bucket**	**Currency Bucket MV%**	**Glob Agg MV%**	**OAD**	**Eligible Futures**	**Futures OAD**	**Weight**
	OAD	100%	20.24%	9.80	JGB 10y	7.21	27.52%
					JPY T-bills (stub)		-7.28%
CAD	**OAD bucket**	**Currency Bucket MV%**	**Glob Agg MV%**	**OAD**	**Eligible Futures**	**Futures OAD**	**Weight**
	OAD	100%	2.58%	8.22	Canadian 10y	7.95	2.67%
					CBA 1m Rate (stub)		-0.09%
AUD Mapped	**OAD bucket**	**Currency Bucket MV%**	**Glob Agg MV%**	**OAD**	**Eligible Futures**	**Futures OAD**	**Weight**
	OAD 0-3y	21.80%	0.28%	2.01	Australia 3y	2.79	0.20%
	OAD 3y+	78.20%	1.02%	7.25	Australia 10y	8.14	0.91%
			1.31%		AUD 1m Depo (stub)		0.19%
Total			**100.00%**				**100.00%**

Note: each futures contract's weight is a funded position. Prior to November 2015, EUR Mapped OAD buckets were 0-3y, 3-5y, 5-7.5y, and 7.5y+.
Source: Bloomberg

3. MFI Return Calculations and Funding Assumptions for Multi-Currency Index

MFI Returns for Multi-Currency Indices (FX Unhedged)

- We compute the month-to-date return (in USD, unhedged) of the Global Aggregate MFI by first calculating the MTD return (in USD, unhedged) of each individual futures positions. To do so, we divide the current futures price by the BOM futures price and subtract 1, then multiply this difference by the percentage change in the FX rate (per USD). The result is the percentage P&L in USD per futures contract, or the unfunded MTD return.

- This unfunded return is then added to the MTD unhedged return (in USD) on the funding position to arrive at the MTD funded futures return.

MFI Returns for Multi-Currency Indices (FX Hedged)

- FX-hedged funded futures returns are calculated as follows: we assume the expected return on a futures position is zero, so there is no hedging at the BOM for each futures position. However, the funding component is hedged following standard index conventions. The fully funded MTD hedged return (in USD) of a futures position is therefore equal to the unfunded MTD return of the futures (or percentage P&L, in USD) plus the MTD hedged return (in USD) of the funding component.
- With the individual MTD unhedged (hedged) MFI returns, we then sum across the Global Agg MFI futures positions, using the BOM MFI weights, to produce the MTD unhedged (hedged) Global Agg MFI return.

Figure 8 shows a sample MTD return (in USD, unhedged) for the Global Aggregate MFI.

Figure 8
Monthly Global Aggregate MFI Total Return (in USD, unhedged), 31 October 2019

Currency	Futures			Funding	
	Contract	Weight	MTD Return (%)	Weight	MTD Return (%)
USD	2y (TUZ9)	18.98%	0.047	18.98%	0.156
	5y (FVZ9)	10.90%	0.046	10.90%	0.156
	10y (TYZ9)	6.14%	-0.012	6.14%	0.156
	30y (USZ9)	4.07%	-0.578	4.07%	0.156
	Ultra (WNZ9)	4.85%	-1.124	4.85%	0.156
	Stub (USD T-bills)			0.86%	0.156
EUR	Schatz (DUZ9)	5.90%	-0.237	5.90%	2.273
	Bobl (OEZ9)	7.33%	-0.777	7.33%	2.273
	Bund (RXZ9)	7.76%	-1.462	7.76%	2.273
	Buxl (UBZ9)	3.52%	-3.548	3.52%	2.273
	Stub (EUR T-bills)			1.03%	2.273
GBP	Long Gilt (G Z9)	6.35%	-1.095	6.35%	5.078
	Stub (GBP T-bills)			-1.79%	5.078
JPY	JGB 10y (JBZ9)	27.52%	-0.690	27.52%	-0.046
	Stub (JPY T-bills)			-7.28%	-0.046
CAD	Canadian 10y (CNZ9)	2.67%	-0.396	2.67%	0.904
	Stub (CBA 1m Rate)			-0.09%	0.904
AUD	Australia 3y (YMZ9)	0.20%	-0.285	0.20%	2.229
	Australia 10y (XMZ9)	0.91%	-1.068	0.91%	2.229
	Stub (AUD 1m Depo)			0.19%	2.229
		MFI MTD Return		100.00%	0.272

Source: Bloomberg

Assessing MFI Performance

MFIs are a component of DHI, as they are the instrument that removes the desired amount of Treasury duration from a particular cash index. How well a DHI tracks an index's excess returns will depend in large part on how well MFIs track the cash treasury market. We will quantify how well DHIs allow investors to capture index excess returns. However, before doing so, it is

instructive to show how well MFIs track the treasury market. In addition, although MFIs are not expected to track indices with a large spread component precisely, especially over long periods, we illustrate how well they can serve as a hedging and replication instrument for indices with a large spread component.

We present historical MFI performance for several notable USD and global indices. Unlike an RBI, which is designed to track closely the total return of an underlying index, including its spread component of return, an MFI is designed to track only the treasury component of the underlying index's return. To illustrate that the MFI tracks cash treasury market returns well, we first show how the US Treasury MFI tracks the US Treasury cash index. If the MFI is doing a good job, we would expect the short- and long-term average monthly tracking error and TEV to be very low.

Sources of MFI Tracking Error

Any cash-futures basis volatility will lead to MFI tracking error (i.e., return difference between the MFI and Treasury component of a cash index's return)

An MFI should not be expected to match exactly an index's treasury component of return, for two reasons. First, the MFI contains only futures contracts, whereas the treasury component of an index's return is computed using cash treasury data. So any cash-futures basis volatility will lead to an MFI tracking error (i.e., the return difference between the MFI and treasury component of a cash index's return).

Second, the treasury component of an index's return is calculated by matching the six KRD exposures of each index bond to a set of six hypothetical par treasury bonds at the beginning of each month. The index calculates the price of each hypothetical treasury by pricing the bond off the treasury spline curve. So even if the treasury-futures basis is stable, the MFI return may not match the reported treasury component of return if the MFI's OAD matching methodology leads to a different treasury return than does the KRD matching methodology. This is more likely to be the case in markets with sharp movements in the shape of the yield curve or for indices where the constituents have amortizing principal (e.g., MBS).[17]

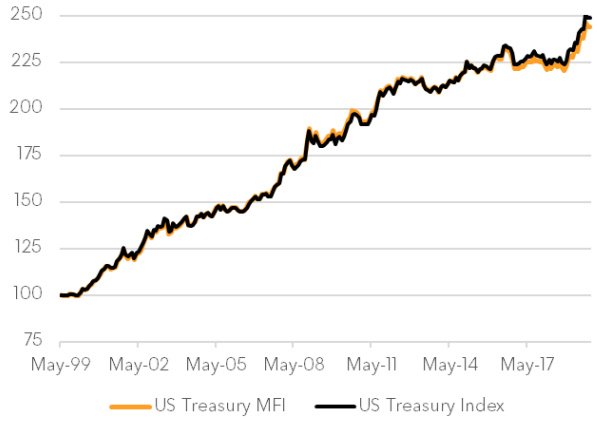
Next, we turn our attention to indices with spread components (e.g., the US Aggregate). As mentioned at the outset, the main source of an index's return volatility is from its exposure to the treasury term structure. Consequently, we would expect an index's MFI also to track its total returns broadly, except for periods of significant spread widening/tightening and for the spread carry component of return. For a wide variety of indices, the MFI captures the great majority of a cash index's total return. These results should encourage investors to consider using MFI as a hedge for index returns driven by exposure to the term structure.

US Treasury MFI

As an initial check on the accuracy of the MFI (and, hence, the DHI) methodology, how well does the US Treasury MFI match the total returns of the US Treasury Index? As shown in Figure 10, except for the volatile cash-futures basis period of September 2008-March 2009, when the normal cash-futures arbitrage broke down, the monthly return differences between the cash Treasury index and its MFI have been small.

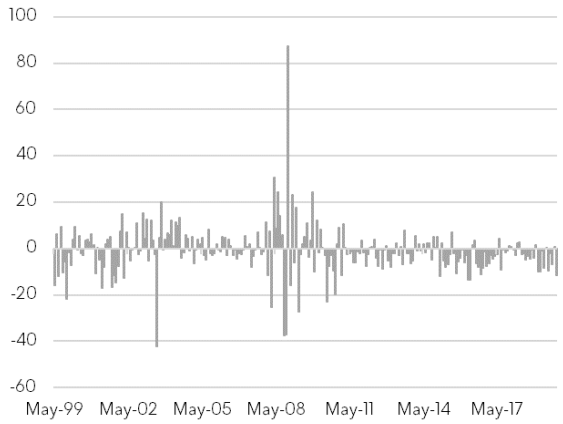
[17] We do not use KRD matching when constructing the MFI primarily for simplicity, but also because this can lead to large, and sometimes short, Treasury futures positions. For example, although the MFI positions are all expected to be long futures positions, KRD matching may lead to, say, a short 5y futures position, offset by a somewhat larger long 10y futures position. This situation can arise because the 5y and 10y futures contracts may have 5y KRD exposure. If a cash index loads heavily on the 10y KRD and less so on the 5y KRD, a short 5y futures position may be necessary to get the 5y KRD exposure in alignment with the cash index. We believe such a pattern of futures weights would be confusing to users.

Figure 9
US Treasury MFI vs. Cash Index, Index Values, May 1999-October 2019



Source: Bloomberg

Figure 10
Realized Monthly TE of US Treasury MFI vs. Cash Index, May 1999-October 2019, bp



Source: Bloomberg

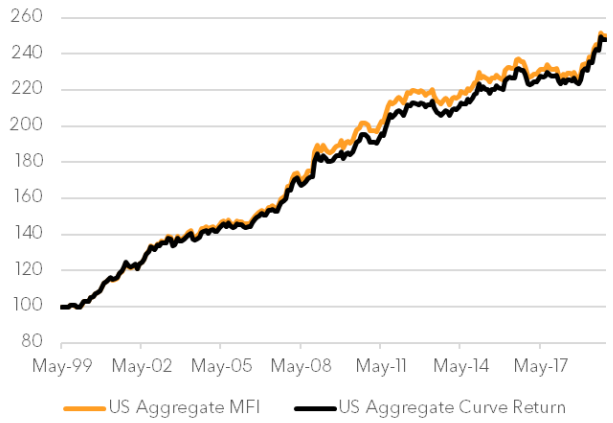
For May 1999-October 2019, the average monthly tracking error has been -0.9bp with a TEV of 10.6bp. Figure 9 shows the index values of the US Treasury Index and its MFI. The largest monthly tracking error was 87.3bp in November 2008.

US Aggregate MFI

We would not expect the US Aggregate MFI to track the Aggregate Index very closely, due to the relatively large spread component of the Aggregate. However, the Aggregate MFI can serve a useful, low-cost hedging and replication role. To evaluate the hedging usefulness of the US Aggregate MFI, we compare its returns with those of the Aggregate Index.

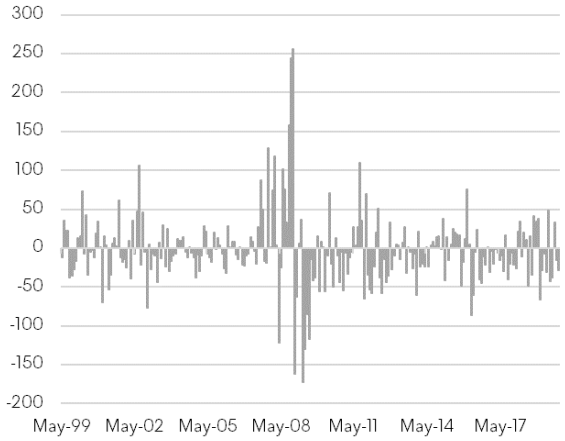
The average monthly tracking error has been -2.7bp, with a TEV of 46.8bp, over May 1999-October 2019 (Figure 12). Figure 11 shows the index values of the US Aggregate MFI vs US Aggregate Index's curve return (total return minus excess return). As expected, the largest monthly tracking errors occurred during fall 2008. For November 2008, the monthly tracking error was 256.5bp (i.e., the MFI outperformed), due to the large widening experienced by the spread sectors of the Aggregate. Much of this outperformance, however, was recouped in spring 2009. Excluding September 2008-March 2009, the average monthly tracking error has been -4.8bp, with a TEV of 38.5bp and a maximum monthly tracking error of -172.2bp (April 2009). Over long periods, we would expect the MFI to underperform the cash index, given the lack of spread carry in the former.

Figure 11
US Aggregate MFI vs. US Aggregate Curve Return, Index Values, May 1999-October 2019



Source: Bloomberg

Figure 12
Realized Monthly TE of US Aggregate MFI vs. US Aggregate Total Return, May 1999-October 2019, bp



Source: Bloomberg

For investors managing against the Aggregate, initiating a short or long Aggregate MFI overlay (without the funding component of the MFI) may be a good way to adjust Treasury exposure quickly. Another use of the Aggregate MFI is for an alpha-beta recombination (i.e., portable alpha) strategy. Managers with a good source of alpha can overlay the (unfunded) Aggregate MFI to produce a synthetic Aggregate portfolio.

Global Treasury G7 MFI

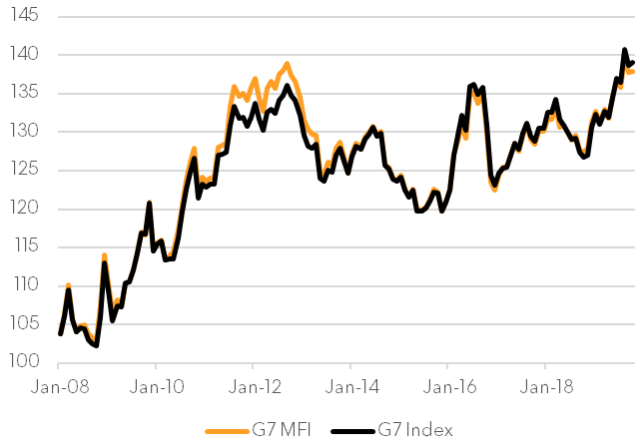
As we did with the US Treasury MFI, an initial check on the accuracy of the MFI methodology in a global context is to examine how well the Global Treasury G7 MFI tracks the Global Treasury G7 Index, which as of September 2019 contained treasuries from seven countries (Canada, France, Germany, Italy, Japan, UK and US), denominated in their local currencies.

The G7 Treasury MFI contains futures contracts representing all five currencies. However, approximately 12% of the index market value (France (6%) and Italy (6%)) is not represented by a futures market, as the EUR-denominated futures markets represent the German treasury market. So some tracking error is expected to the extent that French and Italian treasury markets diverge from the German one.

Figures 13 and 14 show the tracking performance of the Global Treasury G7 MFI versus the cash index. For January 2008-October 2019, the average monthly tracking error between the cash index and its MFI was -0.5bp, with a TEV of 24.6bp. As expected, the largest monthly tracking error (93.5bp) occurred during the height of the European sovereign crisis (July 2011) when the Italian, and to a lesser extent, the French treasury markets diverged from the German treasury market. As the sovereign crisis subsided, the cumulative performance of the cash index and its MFI rejoined each other.

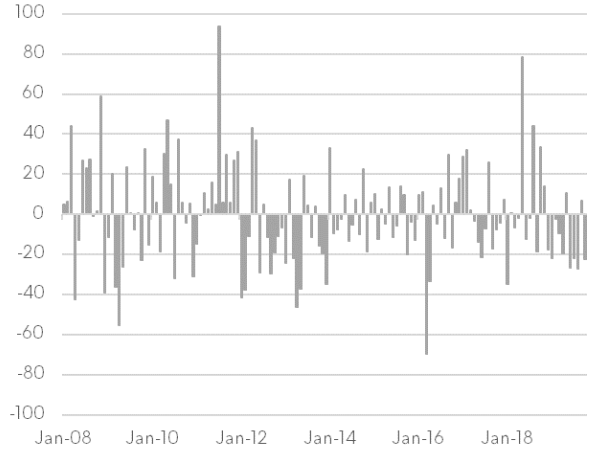
Despite the severity of the sovereign crisis, however, the MFI tracked the global treasury markets with a relatively low tracking error volatility.

Figure 13
Global Treasury G7 Index vs. Global Treasury G7 MFI, (%, USD unhedged), Index Values, January 2008-October 2019



Source: Bloomberg

Figure 14
Realized Monthly TE of Global Treasury G7 MFI vs. Global Treasury G7 Index, January 2008-October 2019, bp, USD unhedged



Source: Bloomberg

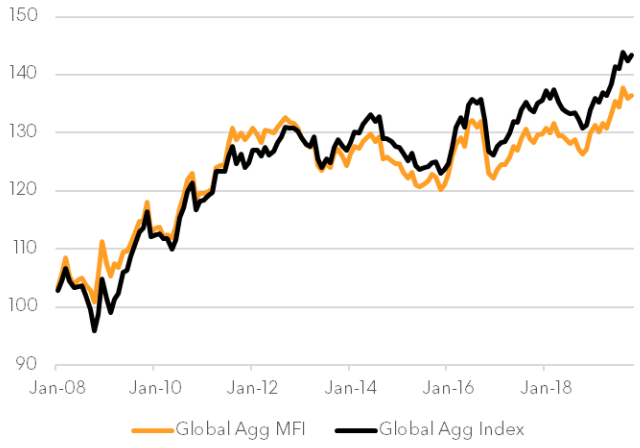
For comparison, consider the Global Treasury MFI. The average monthly TE and TEV for the Global Treasury Index and its MFI are 0.5bp and 38.4bp, respectively. As of September 2019, the Global Treasury Index contained treasuries from 41 countries, representing 25 currencies while the Global Treasury MFI contained futures contracts from only six countries representing six currencies. Approximately 30% of the Global Treasury's market value is not represented by a domestic futures contract market. In addition, the Global Treasury Index once contained countries (e.g., Greece) that were subsequently removed at a time of extreme underperformance as a result of the European sovereign crisis. Consequently, we would expect the Global Treasury MFI to track its index less well than either the G7 Treasury MFI or the US Treasury MFI.

Global Aggregate MFI

As with the US Aggregate MFI, we would not expect the Global Aggregate MFI to track the cash Global Aggregate Index as well as the Global Treasury MFI tracked its index. Nevertheless, the Global Aggregate MFI can be very useful. It can serve as a useful hedging tool as it will remove the largest source of return volatility. Also, as mentioned above, it can serve as a synthetic beta source for alpha-beta recombination strategies.

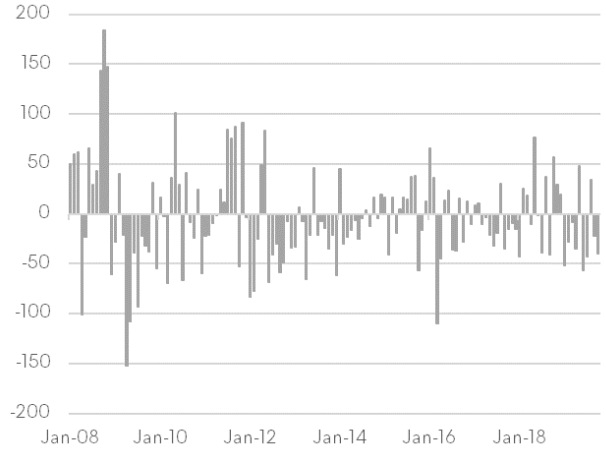
The Global Aggregate MFI has an average monthly tracking error versus the Global Aggregate of -3.6bp, with a TEV of 49.9bp over January 2008-October 2019. Figure 15 shows the index values of the Global Aggregate MFI vs. the cash index. The largest monthly tracking error was 184.3bp (November 2008) (Figure 16).

Figure 15
Global Aggregate MFI vs. Global Aggregate Index, (in USD unhedged), Index Values, January 2008-October 2019



Source: Bloomberg

Figure 16
Realized Monthly TE of Global Aggregate MFI vs. Global Aggregate Index, January 2008-October 2019, bp, USD unhedged



Source: Bloomberg

Duration Hedged Index (DHI) Methodology

We describe how DHIs are calculated using cash bond indices and MFIs, and then compare DHI returns with published excess returns for a number of flagship Bloomberg Indices.

DHI Construction

A DHI is defined as a cash index minus its MFI. Since the MFI is a funded index, we add back the MFI funding component to the DHI so that the latter is also a funded index.

For example, to calculate the US Aggregate DHI return (Figure 17), we start with the US Aggregate Index total return and subtract the US Aggregate MFI total return. However, since both of these are "funded" indices, the difference between the two is a return on a zero net capital investment (i.e., an unfunded return). So we add back the MFI "funding" return component of the Aggregate MFI to generate the Aggregate DHI return. This makes the latter a funded return, which is how most benchmarks are expressed. Both FX-hedged and unhedged DHI returns are available.

Figure 17
US Aggregate DHI Return Calculation, 31 October 2019

US Aggregate Mirror Futures Index					
OAD Bucket	Futures			Funding (T-bills)	
	Contract	Weight	MTD Returns (%)	Weight	MTD Return (%)
0-3y	TUZ9	42.00%	0.047	42.00%	0.156
3-5y	FVZ9	23.83%	0.046	23.83%	0.156
5-7.5y	TYZ9	12.77%	-0.012	12.77%	0.156
7.5-15y	USZ9	8.62%	-0.578	8.62%	0.156
15y+	WNZ9	10.99%	-1.124	10.99%	0.156
Stub Position				1.79%	0.156
				MFI MTD Total Return →	0.012
				Cash Index MTD Total Return →	0.301
				DHI MTD Total Return →	0.445

US Aggregate DHI MTD Total Return

≡ US Agg Index MTD Total Return

– US Agg MFI MTD Total Return

+ MFI Funding MTD Total Return

= 0.301 – 0.012 + 0.156

= 0.445

Source: Bloomberg

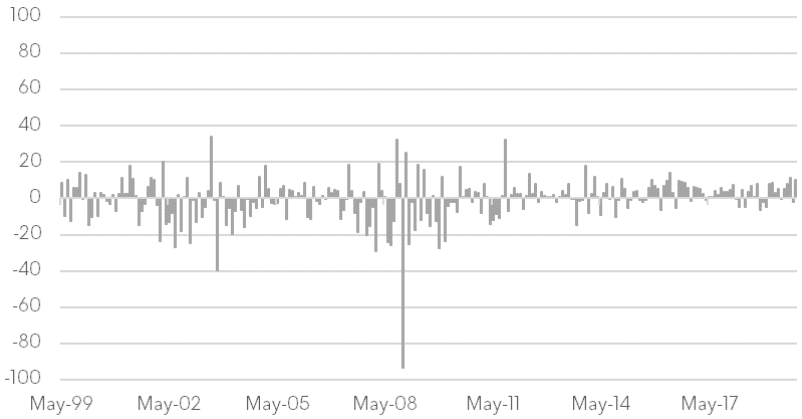
DHI Tracking Performance

A DHI less its associated MFI funding component should closely track the underlying index's reported excess returns. We consider several indices to examine the historical tracking performance of DHIs.

US Aggregate DHI

For May 1999-October 2019, the average monthly tracking error of the US Aggregate DHI (less MFI funding) versus the excess returns of the US Aggregate was -0.4bp, with a TEV of 12.0bp (Figure 18). The largest monthly tracking error was -93.5bp (November 2008).

Figure 18
US Aggregate DHI (less funding) vs. US Aggregate Excess Returns, May 1999-October 2019, bp



Source: Bloomberg

Global Aggregate DHI

For January 2008-October 2019, the average monthly tracking error of the Global Aggregate DHI (less MFI funding) versus the excess returns of the Global Aggregate, both USD unhedged, was -0.2bp with a TEV of 16.8bp (Figure 19). The largest monthly tracking error was -69.2bp (November 2008).

Figure 19
Global Aggregate DHI (less funding) vs. Global Aggregate Excess Returns, January 2008-October 2019, bp

Source: Bloomberg

As shown, the DHI, less funding, does not exactly track the cash index's excess returns. There are many sources for this tracking error. First, a DHI uses OAD bucketing, not the KRD matching that is used when computing index excess returns. Second, it uses Treasury futures to hedge Treasury curve exposure, not hypothetical cash par Treasury bonds as used for index excess returns. Consequently, the tracking error between DHI and excess returns will be influenced by fluctuations in the cash-futures basis. Finally, for global indices, the DHI is limited to using liquid futures contracts from a limited set of markets, which requires mapping "non-futures" currencies to "futures" currencies. In contrast, index excess returns are calculated for each currency market. Return differences between "non-futures" and "futures" currencies will produce tracking error between DHI and excess returns.

Partially Hedged DHI

Rationale

While some investors may seek a benchmark that hedges interest rate duration completely, others may still want to (or are required to) retain some exposure to interest rates as a part of their overall portfolio allocations, while keeping a similar spread duration profile as their existing index.

The residual interest rate exposure being sought may be expressed as a specific fixed duration target (e.g., 2y) or as a percentage-based scaling down of their benchmark duration vis-à-vis a standard Bloomberg Index (e.g., 50% hedged, 75% hedged). In fact, some investors in this camp may be constrained by explicit policy guidelines or investment management agreements that specify (in percentage terms) how large a duration mismatch they are allowed to maintain in an active portfolio.

Those who seek a shorter duration cash bond benchmark have deployed a number of strategies. Some have expanded their universe to include shorter duration bonds (such as floating rate notes or fixed rate bonds with less than 1y to maturity), but the size of these two universes is generally much smaller than the one measured by existing broad-based Bloomberg Indices. Others have sought to lower duration by excluding longer maturity bonds from their benchmark and measure themselves against only the short end of their true investment universe (e.g., 1-3y, 1-5y, 1-10y), but this greatly reduces the size of the investment choice set, scales back spread duration considerably, and limits the diversification options for those whose expertise lies in credit analysis and issuer selection.

While these approaches may lower overall benchmark duration, they also dramatically alter the investment universe and may be viewed as a significant change in benchmark design, even if

mandated by the various stakeholders that govern benchmark selection (consultants, boards, CIOs, etc.).

Therefore, a partially hedged DHI may be more appealing for investors who are strategically bearish on interest rates but are more neutral-to-bullish on spreads and would therefore want to retain a comparable spread duration exposure and diversification potential to their existing broad-based benchmark index. We are able to offer partially hedged versions of MFI and DHI that retain a desired residual interest rate duration exposure by scaling back (or even leveraging up) the size of the futures replication to match a specific target duration target.

Mechanics

The weighting and return mechanics of the partially hedged DHI are nearly identical to a fully hedged version and track the same full universe as the underlying cash bond index. However, instead of using 100% of the MFI weight, the weighting of the MFI is scaled up or down by a fixed percentage to achieve the desired duration exposure.

For example, for a US Aggregate 50% DHI, 50% of the US Aggregate MFI return will be subtracted from the US Aggregate Index return (and only 50% of the MFI funding return will be added back).

For example, the return for the October 2019 US Aggregate DHI – 50% hedged is as follows:

≡ US Agg Index MTD Total Return

– 50% (US Agg MFI MTD Total Return)

+ 50% (MFI Funding MTD Total Return)

= 0.301 – (0.012 / 2) + (0.156 / 2)

= 0.373

Figures 20 compares the size, sector exposure, durations, and spread durations of the US Aggregate 1-5y Index and the US Aggregate as an example. Over the past 10 years, the US Aggregate 1-5y Index has had an average OAD exposure of ~49% of the full US Aggregate[18], serving as reasonable shorter duration proxy for the US Agg with approximately 50% duration. While having similar durations over time, the US Aggregate DHI 50% Hedged offers investors (in particular, active ones) a much larger universe to choose from (an average of 4,700 more bonds in the broader index over time); far better issuer diversification; and a closer spread duration, sector weight profile, and level of spread carry to the cash bond universe.

Figure 20
Comparison of US Aggregate vs. US Aggregate 1-5 Year Cash Bond Indices, 30 September 2019

	US Aggregate	US Aggregate 1-5y
OAD	**5.78**	**2.54**
OASD	**6.04**	**2.95**
Market Value ($bn)	**$23,144**	**$12,259**
# Bonds	**10,904**	**4,789**
Treasury	257	150
Government-Related	1,022	555
Corporate	6,094	2,249
Securitized	3,531	1,835
Market Value [%]	**100%**	**100%**
Treasury	39.8%	42.3%
Government-Related	5.8%	6.1%
Corporate	25.2%	16.9%
Securitized	29.3%	34.7%

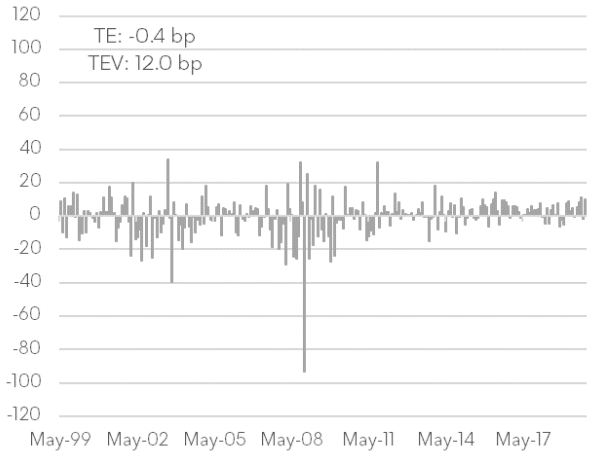
Source: Bloomberg

[18] Ranging between 43% and 55% of the US Aggregate's duration during that window.

Isolating the non-Treasury duration return component of both indices reveals that the DHI tracks the broader US Agg excess return better than the US Agg 1-5y excess return (Figure 21 and 22), making it a potentially more appealing option for investors seeking a shorter duration benchmark, but with comparable spread risk exposure of their existing index.

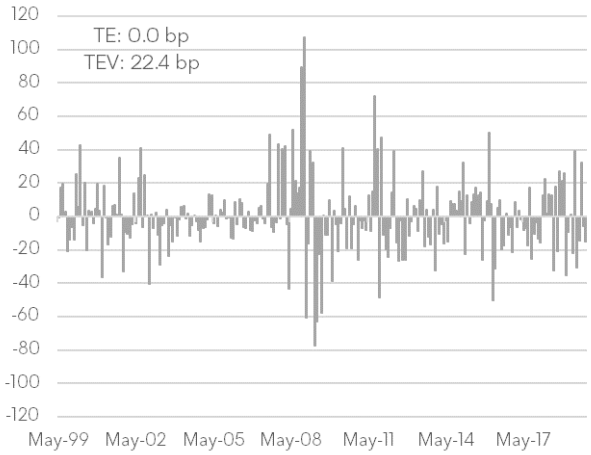
Bloomberg publishes 50% DHI versions in the DHI family only, but different duration hedge ratio options are available upon request as bespoke solutions.

Figure 21
US Agg DHI (less funding) vs. US Agg Excess Returns, May 1999-October 2019, bp



Source: Bloomberg

Figure 22
US Agg 1-5 Yr Excess Returns vs. US Agg Excess Returns, May 1999-October 2019, bp



Source: Bloomberg

1.

Other Customized MFI and DHI

The MFI and DHI methodology permits a high degree of customization. Some requests may be more complex than others, but the platform offers considerable flexibility to address a number of special cases. Those that cannot currently be supported can be researched further and may become available at a future date.

Variables that can be adjusted include:

- **Reference Bloomberg cash bond index**: Most existing standard and bespoke Bloomberg bond indices can be made available as MFI or DHI, which can also be paired with a new custom cash bond index request.
- **Eligible futures contracts**: Clients can request the exclusion of some markets from the standard MFI. For example, they can request the removal of the USD Ultra-Long bond futures contract from the US Aggregate MFI.
- **Funding assumptions**: Other funding assumptions can also be used in the definition of custom MFI and DHI.
- **Additional currency tracking**: Clients can also request that more foreign exchange risk be hedged via the choice of the MFI/DHI constituents. For example, a short-maturity NZD or CHF deposit could be added to the MFI basket to track these currency movements better versus the MFI's base currency. As discussed earlier, the standard MFI maps CHF to EUR. Consequently, the MFI's performance versus the cash index is exposed to CHF/EUR exchange rate movements. Adding a short-maturity CHF deposit (and correspondingly reducing the short-maturity EUR deposit) to the MFI basket would remove this exchange rate risk.
- **Constant duration benchmarks**: The MFI/DHI methodology can also be employed to create constant duration indices. For example, an investor may wish to have a US Aggregate Duration = 3 benchmark for risk management or asset allocation purposes.

- **Alternative duration measures**: Some clients may prefer a Treasury futures hedge based on a different duration measure than the Bloomberg analytical duration measure. For example, a TIPS portfolio manager may want a TIPS MFI that is constructed using an empirical duration measure. This type of customization is currently not available in the platform. However, if an investor is interested in such customizations, please contact the Bloomberg Index group.

Conclusion

Views on interest rates are core to fixed income portfolio management for both active and passive investors. After a generational bull market for rates, many investors concerned about absolute return objectives find themselves repositioning for a rising rate environment over changing time horizons. While some may do this tactically as an overlay strategy, others may prefer their strategic rates view to be reflected in their benchmarks.

Bloomberg Mirror Futures Indices (MFI) and Duration Hedged Indices (DHI) are index solutions that measure the same fixed income choice set as existing Bloomberg Indices, but with a fully or partially hedged interest rate duration exposure that is constructed using liquid futures contracts. As opposed to existing published excess returns on Bloomberg Indices that hedge out interest rate exposure using hypothetical Treasuries, MFI and DHI returns are intended to be replicable and more seamless solutions for those considering a benchmark switch that preserves many of the characteristics of their existing benchmark. The intuitive, rules-based, and objective design of this offering makes them a viable alternative.

Appendix: Accessing Mirror Futures and Duration Hedged Indices

Bloomberg Terminal

Index tickers that display the total return index levels are available on Bloomberg. A list of initial total return tickers for major indices can be found in Figure 23.

Figure 23
Bloomberg Tickers for MFI and DHI versions of flagship Bloomberg Indices

		USD Total Return		EUR Total Return		GBP Total Return	
	Index	Unhedged	Hedged	Unhedged	Hedged	Unhedged	Hedged
Global	Global Aggregate Mirror Futures	MGAGTRUU	MGAGTRUH	MGAGTREU	MGAGTREH	MGAGTRGU	MGAGTRGH
	Global Aggregate Duration Hedged	DGLATRUU	DGLATRUH	DGLATREU	DGLATREH	DGLATRGU	DGLATRGH
	Global Aggregate Duration Hedged - 50% Hedged	DGA5TRUU	DGA5TRUH	DGA5TREU	DGA5TREH	DGA5TRGU	DGA5TRGH
	Global Aggregate ex USD Mirror Futures	MGXUTRUU	MGXUTRUH	MGXUTREU	MGXUTREH	MGXUTRGU	MGXUTRGH
	Global Aggregate ex USD Duration Hedged	DGXUTRUU	DGXUTRUH	DGXUTREU	DGXUTREH	DGXUTRGU	DGXUTRGH
	Global Aggregate ex USD Duration Hedged - 50% Hedged	DGX5TRUU	DGX5TRUH	DGX5TREU	DGX5TREH	DGX5TRGU	DGX5TRGH
	Global Aggregate Corporate Mirror Futures	MGCOTRUU	MGCOTRUH	MGCOTREU	MGCOTREH	MGCOTRGU	MGCOTRGH
	Global Aggregate Corporate Duration Hedged	DGLCTRUU	DGLCTRUH	DGLCTREU	DGLCTREH	DGLCTRGU	DGLCTRGH
	Global Aggregate Corporate Duration Hedged - 50% Hedged	DGC5TRUU	DGC5TRUH	DGC5TREU	DGC5TREH	DGC5TRGU	DGC5TRGH
US	US Aggregate Mirror Futures	MUAGTRUU	MUAGTRUH	MUAGTREU	MUAGTREH	MUAGTRGU	MUAGTRGH
	US Aggregate Duration Hedged	DUAGTRUU	DUAGTRUH	DUAGTREU	DUAGTREH	DUAGTRGU	DUAGTRGH
	US Aggregate Duration Hedged - 50% Hedged	DUA5TRUU	DUA5TRUH	DUA5TREU	DUA5TREH	DUA5TRGU	DUA5TRGH
	US Treasury Mirror Futures	MUTRTRUU	MUTRTRUH	MUTRTREU	MUTRTREH	MUTRTRGU	MUTRTRGH
	US Treasury Duration Hedged	DUSTTRUU	DUSTTRUH	DUSTTREU	DUSTTREH	DUSTTRGU	DUSTTRGH
	US Treasury Duration Hedged - 50% Hedged	DUT5TRUU	DUT5TRUH	DUT5TREU	DUT5TREH	DUT5TRGU	DUT5TRGH
	US Corporate Mirror Futures	MUCOTRUU	MUCOTRUH	MUCOTREU	MUCOTREH	MUCOTRGU	MUCOTRGH
	US Corporate Duration Hedged	DUSCTRUU	DUSCTRUH	DUSCTREU	DUSCTREH	DUSCTRGU	DUSCTRGH
	US Corporate Duration Hedged - 50% Hedged	DUC5TRUU	DUC5TRUH	DUC5TREU	DUC5TREH	DUC5TRGU	DUC5TRGH
	US Credit Mirror Futures	MUCTTRUU	MUCTTRUH	MUCTTREU	MUCTTREH	MUCTTRGU	MUCTTRGH
	US Credit Duration Hedged	DUCRTRUU	DUCRTRUH	DUCRTREU	DUCRTREH	DUCRTRGU	DUCRTRGH
	US Credit Duration Hedged - 50% Hedged	DUR5TRUU	DUR5TRUH	DUR5TREU	DUR5TREH	DUR5TRGU	DUR5TRGH
	US TIPS Mirror Futures	MTIPTRUU	MTIPTRUH	MTIPTREU	MTIPTREH	MTIPTRGU	MTIPTRGH
	US TIPS Duration Hedged	DTIPTRUU	DTIPTRUH	DTIPTREU	DTIPTREH	DTIPTRGU	DTIPTRGH
	US TIPS Duration Hedged - 50% Hedged	DTI5TRUU	DTI5TRUH	DTI5TREU	DTI5TREH	DTI5TRGU	DTI5TRGH
Euro	Euro Aggregate Mirror Futures	MEUATRUU	MEUATRUH	MEUATREU	MEUATREH	MEUATRGU	MEUATRGH
	Euro Aggregate Duration Hedged	DEAGTRUU	DEAGTRUH	DEAGTREU	DEAGTREH	DEAGTRGU	DEAGTRGH
	Euro Aggregate Duration Hedged - 50% Hedged	DEA5TRUU	DEA5TRUH	DEA5TREU	DEA5TREH	DEA5TRGU	DEA5TRGH
	Euro Corporate Mirror Futures	MECOTRUU	MECOTRUH	MECOTREU	MECOTREH	MECOTRGU	MECOTRGH
	Euro Corporate Duration Hedged	DECPTRUU	DECPTRUH	DECPTREU	DECPTREH	DECPTRGU	DECPTRGH
	Euro Corporate Duration Hedged - 50% Hedged	DEP5TRUU	DEP5TRUH	DEP5TREU	DEP5TREH	DEP5TRGU	DEP5TRGH

Source: Bloomberg

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