

Global Aggregate: Mirror Future and Duration Hedged Indices

This document is intended to be read in conjunction with the [Mirror Futures and Duration Hedged Indices Methodology](#), [Global Fixed Income Methodology](#) and the [Global Aggregate Index](#), these documents collectively constitute the index methodology for this Index.

The Global Aggregate Mirror Futures Index (MFI) is a funded benchmark constructed to match the duration risk of the Global Aggregate Index using a basket of Treasury Futures. The Global Aggregate Duration Hedged Index (DHI) is a funded benchmark constructed as the difference between the Total Return of the Global Aggregate Index and the Total Return of the Mirror Future Index. The MFI and DHI Indices follow the Bloomberg Indices' monthly rebalancing conventions. The indices were launched in December 2008.

| | |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description of Index Constituents | The MFI consists of Treasury Futures, and the DHI consists of the Global Agg, Global Agg MFI and the funding component. |
| Index Ticker | I30249US: Global Aggregate Mirror Future Total Return Index Value Unhedged I30251US: Global Aggregate Duration Hedged Total Return Index Value Unhedged |

Eligibility Requirements

| Currency | USD, EUR, GBP, JPY, CAD and AUD | | | | | | | | | | | | | | |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------|------------|--------------------|------------|---------------------------------------------|------------|-----------------------------------|------------|-----|------------|---|------------|---|
| Currency Mapping | The MFI consist of 6 Future currencies, and non-future currencies are mapped to the futures currencies. | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>"Futures" Currency</th> <th>Mapped Global Agg Eligible "Non-Futures" Currency</th> </tr> </thead> <tbody> <tr> <td>USD</td> <td>CLP, COP, MXN, PEN</td> </tr> <tr> <td>EUR</td> <td>CHF, CZK, DKK, HUF, ILS, NOK, PLN, RON, SEK</td> </tr> <tr> <td>JPY</td> <td>CNY, HKD, IDR, KRW, MYR, SGD, THB</td> </tr> <tr> <td>AUD</td> <td>NZD</td> </tr> <tr> <td>CAD</td> <td>-</td> </tr> <tr> <td>GBP</td> <td>-</td> </tr> </tbody> </table> | "Futures" Currency | Mapped Global Agg Eligible "Non-Futures" Currency | USD | CLP, COP, MXN, PEN | EUR | CHF, CZK, DKK, HUF, ILS, NOK, PLN, RON, SEK | JPY | CNY, HKD, IDR, KRW, MYR, SGD, THB | AUD | NZD | CAD | - | GBP | - |
| "Futures" Currency | Mapped Global Agg Eligible "Non-Futures" Currency | | | | | | | | | | | | | | |
| USD | CLP, COP, MXN, PEN | | | | | | | | | | | | | | |
| EUR | CHF, CZK, DKK, HUF, ILS, NOK, PLN, RON, SEK | | | | | | | | | | | | | | |
| JPY | CNY, HKD, IDR, KRW, MYR, SGD, THB | | | | | | | | | | | | | | |
| AUD | NZD | | | | | | | | | | | | | | |
| CAD | - | | | | | | | | | | | | | | |
| GBP | - | | | | | | | | | | | | | | |
| Minimum Liquidity Requirements | None | | | | | | | | | | | | | | |

| | |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Treasury Futures Basket | <p>The MFI consists of 14 different futures contracts:</p> <ul style="list-style-type: none"> • USD: 2-Year US Treasury Futures, 5-Year US Treasury Futures, 10-Year US Treasury Futures, 30-Year US Treasury Futures, Ultra Long US Treasury Futures • EUR: Euro Schatz Futures, Euro Bobl Futures, Euro Bund Futures, Euro Buxl Futures • AUD: Australia 3 Year Treasury Bond Futures, Australia 10 Year Treasury Bond Futures • CAD: 10 Year Government of Canada Bond Futures • JPY: JGB 10 Year Futures • GBP: Long Gilt Futures |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The Futures are weighted to closely match the beginning of the month Option Adjusted Duration (OAD) profile of the Global Aggregate Index. Future Contracts are rolled to the next quarterly expiration month at the beginning of March, June, September, and December.

| | |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Funding Components | A funding component is added to make the MFI and DHI a funded strategy, and comparable with the returns of a traditional cash index. |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|

| "Futures" Currency | Funding Instrument | Ticker |
|--------------------|------------------------------------|----------|
| USD | US short-term treasury bills | I30723US |
| EUR | German short-term treasury bills | I30720EU |
| GBP | UK short-term treasury bills | I30721GB |
| JPY | Japan short-term treasury bills | I30722JP |
| CAD | Canada Bankers Acceptances 1m rate | I30735CA |
| AUD | Australian 1m deposit rate | ADDRA |

Returns Methodology

The basket of futures returns is calculated by the weighted price return of the duration matched futures contracts. The total returns of the funding components are then added to make the MFI a funded index:

Global Agg MFI Total Return = Futures Basket Price Return + Funding Components Total Return

The Global Aggregate DHI Total Return is defined as it's funded excess return:

Global Agg DHI Total Return = {Global Agg Total Return - Global Agg MFI Total Return} + Funding Components Total Return

Construction and Rebalancing Rules

Frequency

For each index, Bloomberg maintains two universes: the Returns (Backward) and the Projected (Forward) Universes. The composition of the Returns Universe is rebalanced at each month-end and represents the fixed weights of index/instrument on which index returns are calculated for the next month. The Projected Universe is a forward-looking projection where the weights in the Futures basket change daily to reflect the characteristics of the target cash index, but are not used for return calculations. On the last business day of the month (the rebalancing date), the weights of the latest Projected Universe becomes the Returns Universe for the following month.

Index OAD Bucketing and Futures Selection

The Global Aggregate Index is sorted first by currency and then by non-overlapping OAD buckets, and each treasury future is assigned to one OAD bucket as displayed in the table below. Breakpoints are selected so that the OAD of each bucket is close to that of its matching futures contract.

MFI Weight Calculation

The basic design for the Global Agg MFI 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. The section on "MFI Construction for a Multi-Currency Index Section" in the [Mirror Futures and Duration Hedged Indices Methodology](#) document has additional details on this mapping from local currencies to liquid markets.

For each eligible futures contract, the OAD is calculated using Bloomberg analytics. The market value of each futures contract needed in the MFI is calculated to match the OAD contribution of the futures position with that of the Global Aggregate Index OAD bucket as displayed in the table below.

Global Aggregate MFI Futures Weights Calculation as of 31st May 2023

| Cash Index | | | | | | Mirror Future Index | | |
|------------|-------------|----------|---------------|------------|-----------|---------------------|----------|--------------------|
| Currency | OAD | Index | USD | Currency | Cash | Futures | Futures | MFI |
| | Bucket | OAD | MV (\$mn) | Bucket MV% | Index MV% | Contract | OAD | Weight |
| | | A | | | B | | C | (A x B) / C |
| USD | OAD 0-3y | 1.94 | 6,993,275.12 | 25.02% | 11.47% | 2y (TUU3) | 1.95 | 11.43% |
| | OAD 3-5y | 3.99 | 6,144,837.62 | 21.98% | 10.08% | 5y (FVU3) | 4.07 | 9.88% |
| | OAD 5-7.5y | 6.22 | 7,265,290.92 | 25.99% | 11.91% | 10y (TYU3) | 5.96 | 12.43% |
| | OAD 7.5-15y | 10.37 | 5,689,812.70 | 20.35% | 9.33% | 30y (USU3) | 11.78 | 8.21% |
| | OAD 15y+ | 17.24 | 1,860,178.04 | 6.65% | 3.05% | Ultra Long (WNU3) | 16.62 | 3.16% |
| | | | | | | US T-bills | | 45.84% |
| EUR | OAD 0-3y | 2.04 | 3,425,695.96 | 25.93% | 5.99% | Schatz (DUU3) | 1.98 | 6.20% |
| | OAD 3-6y | 4.42 | 4,349,785.36 | 32.93% | 7.61% | Bobl (OEU3) | 4.60 | 7.31% |
| | OAD 6-13y | 8.60 | 4,084,253.02 | 30.92% | 7.15% | Bund (RXU3) | 8.48 | 7.24% |
| | OAD 13+y | 18.33 | 1,349,501.31 | 10.22% | 2.36% | Buxl (UBU3) | 20.98 | 2.06% |
| | | | | | | DEM T-bills | | 23.11% |
| GBP | | 8.32 | 2,355,167.34 | 100.00% | 3.82% | Long Gilt (G U2) | 11.43 | 2.78% |
| | | | | | | GB T-bills | | 3.82% |
| JPY | | 9.51 | 14,199,252.51 | 100.00% | 23.01% | 10y (JBU3) | 7.31 | 29.92% |
| | | | | | | JPY T-bills | | 23.01% |
| CAD | | 7.25 | 1,667,425.11 | 100.00% | 2.70% | 10y (CNU3) | 7.78 | 2.52% |
| | | | | | | CBA 1m Rate | | 2.70% |
| AUD | OAD 0-3y | 2.03 | 207,107.68 | 24.30% | 0.37% | 3y (YMU3) | 2.74 | 0.27% |
| | OAD 3+y | 6.84 | 645,059.65 | 75.70% | 1.15% | 10y (XMU3) | 7.80 | 1.01% |
| | | | | | | AUD 1m Depo | | 1.53% |

Pricing and Related Issues

Sources & Frequency

- All Treasury future contracts are priced on a daily basis based on the exchange's settlement prices.
- The T-Bills are priced on a daily basis by BVAL.

Pricing Quotes

Settlement Prices

Timing

- US Treasury Futures: 15:00 ET
- GBP Treasury Futures: 16:20 GMT
- EUR Treasury Futures: 16:30 CET
- JPY Treasury Futures: 16:15 JST
- CAD Treasury Futures: 15:00 ET
- AUD Treasury Futures: 16:30 ACT
- US T-Bills: 16:00 ET
- GBP T-Bills: 16:15 GMT

- EUR T-Bills: 16: 15 GMT
- JPY T-Bills: 15:00 JST
- Canada Bankers Acceptance 1m Rate: 16:00 ET
- Australian 1m Deposit Rate: 17:00 ACT
- If the last business day of the month is a public holiday, prices from the previous business day are used.

Market Side

Futures in the MFI are priced at the settlement price.

Verification

Daily price moves for each security are analyzed by the index pricing team to identify outliers. Index users may also challenge price levels, which are then reviewed and updated as needed.

Calendar

The Global Aggregate Index is a global, multi-currency index that is generated every business day of the year except for January 1, the only holiday common to all regional calendars. During holidays observed by local markets, the index will still be generated using prices from the previous business day

Environmental, Social and Governance (ESG) Disclosures

The Index does not take into account any ESG factors or pursue any ESG objectives, please refer to the [Global Fixed Income Methodology](#) ESG disclosures.

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