S&P Dow Jones Indices

A Division of S&P Global

INDEX ANNOUNCEMENT

LGIM Matching Core Indices Hedging Multiples Methodology Update

LONDON, NOVEMBER 27, 2024: S&P Dow Jones Indices (”S&P DJI”) announces a change to the LGIM Matching Plus methodology.

S&P DJI is updating the Hedging Multiples calculation within the LGIM Matching Plus indices methodology, specifically for the Inflation Swap indices. This update includes formula modifications to the Initial Margin, Hedging Multiple, Optimal Hedging Multiple, Hedging Multiple Upper Bound, Hedging Multiple Lower Bound, and Benchmark Headroom. The changes are detailed in the table below.

<table>
<tr><th rowspan="2">Change</th><th colspan="2">Methodology</th></tr>
<tr><th>Previous</th><th>Updated</th></tr>
<tr>
<td>Initial Margin</td>
<td>
For each swap index of Fixed Swap, Inflation and Real Swap as defined in Table 4: Swap Based Indices the Initial Margin amount is calculated as certain multiples of the price risk sensitivities (PV01 or IE01) of their underlying swap instrument. The cash inflow/outflow of Initial Margin account is withdrew from/injected into the Cash Account. On the rebalance date the Initial Margin Account remains constant without re-scaling.

$$\mathrm{IMCash}_t = \sum_{i=1}^{n} (\mathrm{BaseRiskSensitivity}_{t,i} \times \mathrm{RiskMultiple}_i)$$
<table>
<tr><th>Index Family</th><th>BaseRiskSensitivity</th><th>RiskMultiple</th></tr>
<tr><td>Fixed Swap</td><td>PV01 of fixed swap</td><td>40</td></tr>
<tr><td>Inflation Swap</td><td>IE01 of inflation swap</td><td>30</td></tr>
<tr><td>Real Swap</td><td>IE01 of inflation swap</td><td>45</td></tr>
</table>
</td>
<td>
For each swap index within the Fixed Swap and Real Swap[1] index families, as defined in Table 4: Swap Based Indices, the Initial Margin amount calculates as certain multiples of the price risk sensitivities (PV01 or IE01) of the underlying swap instrument. The cash inflow/outflow of the Initial Margin account is withdrawn from/injected into the Cash Account. On the rebalancing date, the Initial Margin Account remains constant without re-scaling.

$$\mathrm{IMCash}_t = \sum_{i=1}^{n} (\mathrm{BaseRiskSensitivity}_{t,i} \times \mathrm{RiskMultiple}_i)$$
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For each Inflation Swap index, the Initial Margin Account calculates as:
$$IMCash = ca.f.(SEV_{(0,0)} - SEV_{(1,0)})$$
where:
$$SEV_{(a,b)} = n.\left[\frac{I_r.(1+i-a)^t}{(1+r-b)^t} - \frac{R_f}{(1+r-b)^t}\right]$$
ca = collateral adjustment, set to 50
f = % of index risk from swaps, set to 100%
$SEV_{(0,0)}$ = swap equivalent value under current inflation curve and current interest rate curve
$SEV_{(1,0)}$ = swap equivalent value under current inflation curve plus 1bp and current interest rate curve
$SEV_{(a,b)}$ = swap equivalent value under current inflation curve plus a bp and current interest rate curve plus b bp
i = implied inflation rate from current to inflation swap maturity
</td>
</tr>
</table>

[1] There is no change to the Initial Margin of the Fixed Swap and Real Swap index families.

Change	Methodology	
	Previous	**Updated**
		r = interest rate from current to inflation swap maturity R_f = the payoff of the fixed leg of the swap at maturity I_r = cumulative inflation from swap inception till current, calculated as current inflation level with two-month lag / inflation level at swap inception t = duration between current till swap maturity in years a = inflation rate change in bps b = interest rate change in bps
Hedging Multiple	The Hedging Multiple on Index Business Date t is calculated as: $\boldsymbol{HM_t = \frac{BEV_t}{NAV_t}}$ Where HM_t = Hedging Multiple as of Index Business Day t BEV_t = Bond Equivalent Value as of date t as defined in Table 8: Bond Equivalent Value NAV_t = Net Asset Value of the underling security, equivalent to the index level calculated as of date t	The Hedging Multiple on Index Business Date *t* calculates as: For Inflation Swap Indices: $HM_t = \frac{notional_t}{NAV_t}$ Otherwise: $\boldsymbol{HM_t = \frac{BEV_t}{NAV_t}}$ where: $notional_t$ = Inflation swap notional amount as of Index Business Day *t* HM_t = Hedging Multiple as of Index Business Day *t* BEV_t = Bond Equivalent Value as of date *t* as defined in Table 8: Bond Equivalent Value NAV_t = Net Asset Value of the underlying security, equivalent to the index level calculated as of date *t*
Hedging Multiple Upper Bound	For Type B: Inflation Swap ca = collateral adjustment, set to 60 for Inflation Swap $\mathrm{MAX}(1.2, \mathrm{MIN}(\left[1 + (\mathrm{ca} \times \mathrm{f} \times ((1 + \mathrm{r} - \mathrm{ohr} + \mathrm{ulr} + \mathrm{l})^{\mathrm{d}} - (1 + \mathrm{r} - \mathrm{ohr} + \mathrm{ulr} + \mathrm{l} - 0.0001)^{\mathrm{d}}) - (1 + \mathrm{r} - \mathrm{ohr} + \mathrm{ulr})^{\mathrm{d}})) / ((1 + \mathrm{r})^{\mathrm{d}}), 7.7\right]))$	For Type B: Inflation Swap *ca* = collateral adjustment, set to 50 for Inflation Swap x = half headroom target, set to 150 bps $MIN\left(\left[\frac{I_r.[(1+i)^t + ca.f((1+i)^t - (1+i-0.0001)^t)] - R_f}{(1+r)^t} - \frac{I_r.(1+i-x+ulr/2)^t - R_f}{(1+r-x+ulr/2)^t}\right]^{-1}, \frac{7.7}{I_r}.\frac{(1+r)^t}{(1+i)^t}\right)$
Hedging Multiple Lower Bound	For Type B: Inflation Swap $\mathrm{MAX}(1.0, \mathrm{MIN}(\left[1 + (\mathrm{ca} \times \mathrm{f} \times ((1 + \mathrm{r} - \mathrm{ohr} - \mathrm{lhr} + \mathrm{l})^{\mathrm{d}} - (1 + \mathrm{r} - \mathrm{ohr} - \mathrm{lhr} + \mathrm{l} - 0.0001)^{\mathrm{d}}) - (1 + \mathrm{r} - \mathrm{ohr} - \mathrm{lhr})^{\mathrm{d}})) / ((1 + \mathrm{r})^{\mathrm{d}}), 5.6\right]))$	For Type B: Inflation Swap $MIN\left(\left[\frac{I_r.[(1+i)^t + ca.f((1+i)^t - (1+i-0.0001)^t)] - R_f}{(1+r)^t} - \frac{I_r.(1+i-x-llr/2)^t - R_f}{(1+r-x-llr/2)^t}\right]^{-1}, \frac{5.6}{I_r}.\frac{(1+r)^t}{(1+i)^t}\right)$
Optimal Hedging Multiple	For Type B: Inflation Swap	For Type B: Inflation Swap

	Methodology	
Change	Previous	Updated
	$\text{MAX}\left(1.1, \text{MIN}\left(\left\lceil 1 + (\text{ca} \times \text{f} \times ((1 + \text{r} - \text{ohr} + \text{l})^{\text{d}} - (1 + \text{r} - \text{ohr} + \text{l} - 0.0001)^{\text{d}}) - (1 + \text{r} - \text{ohr})^{\text{d}})) / ((1 + \text{r})^{\text{d}}), 6.5 \right\rceil\right)\right)$	$MIN\left(\left[\frac{I_r.[(1+i)^t + ca.f((1+i)^t - (1+i-0.0001)^t)] - R_f}{(1+r)^t} - \frac{I_r.(1+i-x)^t - R_f}{(1+r-x)^t}\right]^{-1}, \frac{6.5}{I_r}.\frac{(1+r)^t}{(1+i)^t}\right)$
Benchmark Headroom	For Type B: Inflation Swap benchmark headroom (bps) : Is the rate, *chr*, derived from reversing the hedging multiple formula provided below $\text{Current HM} = \left\lceil 1 + (\text{ca} \times \text{f} \times ((1 + \text{r} - \text{chr} + \text{l})^{\text{d}} - (1 + \text{r} - \text{chr} + \text{l} - 0.0001)^{\text{d}}) - (1 + \text{r} - \text{chr})^{\text{d}})) / ((1 + \text{r})^{\text{d}}) \right\rceil$	For Type B: Inflation Swap benchmark headroom (bps) is the minimum *X* (in bps) where *X=2x* that satisfies the below condition where $SEV_{(a,b)}$ is defined under "Initial Margin" $1 + SEV_{(x,x)} - SEV_{(0,0)} - ca.f.(SEV_{(0,0)} - SEV_{(1,0)}) \leq 0$

IMPACTED INDICES

Index Name	Ticker
2025 Inflation Swap Index	LGIM2025IS
2030 Inflation Swap Index	LGIM2030IS
2035 Inflation Swap Index	LGIM2035IS
2040 Inflation Swap Index	LGIM2040IS
2045 Inflation Swap Index	LGIM2045IS
2050 Inflation Swap Index	LGIM2050IS
2060 Inflation Swap Index	LGIM2060IS

IMPLEMENTATION TIMING

S&P DJI is implementing the previously described methodology change in December 2024, which takes effect prior to the market open on **December 12, 2024**. The change will first be visible to clients in preliminary membership files beginning on **December 12, 2024.**

ABOUT S&P DOW JONES INDICES

S&P Dow Jones Indices is the largest global resource for essential index-based concepts, data and research, and home to iconic financial market indicators, such as the S&P 500 ® and the Dow Jones Industrial Average®. More assets are invested in products based on our indices than products based on indices from any other provider in the world. Since Charles Dow invented the first index in 1884, S&P DJI has been innovating and developing indices across the spectrum of asset classes helping to define the way investors measure and trade the markets.

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