S&P Dow Jones Indices
A Division of **S&P Global**

An Overview of Return Types for Insurance Indices

Contributors

Kevin Patalano
Senior Analyst
Multi-Asset Indices
kevin.patalano@spglobal.com

Maxime Fouilleron
Analyst
Multi-Asset Indices
maxime.fouilleron@spglobal.com

Introduction

Indices, including those used in insurance products, such as fixed index annuities (FIAs), registered index-linked annuities (RILAs) and index universal life (IUL), use one of these three return types: price return (PR), total return (TR) or excess return (ER). These return types serve different purposes and are ultimately an element to consider as part of the overall construction of an index.

Price return measures the capital appreciation (or depreciation) of an asset. For an index, the price return measures the price fluctuations in the underlying constituents within the index.

Total return measures the price return of an asset with dividends added. As dividends are issued by underlying index constituents, the dividend amounts are theoretically reinvested in the underlying asset, which incrementally increases exposure to the underlying asset. As more dividends are issued, more shares of the underlying asset are added to the index (or theoretically "purchased"), which in turn generates dividends paid on the original investment as well as these new shares, which are then again used to "buy" even more shares.

Indices used in insurance products often contain exposure to an underlying equity index as well as a cash allocation. A total return index used with insurance products would also typically include the theoretical return on the cash component if the index has a cash allocation invested at a certain rate, such as the Secured Overnight Financing Rate (SOFR), the federal funds rate or the yield on a 3-month U.S. Treasury bill.

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Excess return is often surrounded by confusion, since it can have different meanings depending on the context. To simplify the term, we are going to break "excess return" down into two definitions.

In its simplest form, excess return measures a return above some sort of baseline. The math is the same in both definitions, but the reason for using excess return can differ based on the industry.

- In the world of active management, excess return can be defined as the return above a benchmark, or "alpha". Active managers of ETFs, mutual funds and hedge funds often measure the performance of their fund against a benchmark, like the <u>S&P 500®</u>. Their goal is often to create as much alpha as possible. In other words, they are looking to "beat the market."

- In the world of indices used with insurance products (e.g., FIAs, RILAs and IUL), excess return measures the return of one or more underlying assets minus an interest rate. This interest rate is subtracted to help improve hedge efficiencies, often leading to cost savings for the insurance carrier, which may ultimately benefit the end policyholder.

It is worth noting that the term "excess return" is sometimes used as shorthand for "excess total return" or "excess price return" in the insurance space. Most indices underlying insurance products are excess total return indices, meaning the theoretical interest rate is subtracted from the total return of the underlying assets in the index. However, excess price return indices also exist in the insurance marketplace. For the purposes of this piece and in order to align with the S&P Dow Jones Indices naming conventions, "excess return" will be used to refer to "excess total return."

It is not possible to invest directly in an index. Exposure to an asset class represented by an index may be available through investable instruments based on that index.

Index Return Analysis

In Exhibit 1, we highlight the performance difference between the total return and excess return versions of the same index over a one-year period. While these indices employ different theoretical interest rates in their methodologies (i.e., Effective Fed Funds Rate, SOFR, SOFR + 0.13088 and SOFR + 0.02963) the commonality between all of them is the nature of the total return versus excess return performance gap. The sum of the difference of daily returns column and the average of these sums displayed in Exhibit 1 indicate that the gap between the excess return and total return for each index is aligned with the value of the index's respective interest rate. This supports the claim of the second definition made in the previous section: the excess return index is calculated as the total return minus a given interest rate.

Exhibit 1: One-Year Performance Analysis for Insurance Indices

Index	Excess Return (%)	Total Return (%)	Performance Difference (%)	Sum of the Difference of Daily Returns (%)	Effective Fed Funds Rate
S&P 500 Factor Rotator Daily RC2 7% Index	-4.085	-0.046	4.040	4.125	
S&P MARC 5% Index	-0.248	4.012	4.260	4.182	
S&P MAESTRO 5 Index	-4.146	-0.052	4.094	4.182	
Average	-	-	**4.131**	**4.163**	**4.178**
Index	**Excess Return (%)**	**Total Return (%)**	**Performance Difference (%)**	**Sum of the Difference of Daily Returns (%)**	**SOFR + 0.13088**
S&P 500 Dividend Aristocrats® Daily RC 5% Index	1.406	5.843	4.437	4.283	
S&P 500 Low Volatility Daily RC 5% Index	-1.543	2.766	4.309	4.283	
S&P 500 Daily RC2 8% Index	5.517	10.134	4.617	4.283	
S&P 500 Daily RC2 10% Index	2.292	6.769	4.477	4.283	
S&P 500 Sector Rotator Daily RC2 5% Index	-2.695	1.564	4.259	4.283	
S&P BRIC 40 Daily RC2 15% Index	-5.184	-1.034	4.150	4.281	
Average	-	-	**4.370**	**4.283**	**4.279**
Index	**Excess Return (%)**	**Total Return (%)**	**Performance Difference (%)**	**Sum of the Difference of Daily Returns (%)**	**SOFR + 0.02963**
S&P 500 Daily Risk Control 5% Index	3.690	8.115	4.425	4.180	
Average	-	-	**4.425**	**4.180**	**4.177**
Index	**Excess Return (%)**	**Total Return (%)**	**Performance Difference (%)**	**Sum of the Difference of Daily Returns (%)**	**SOFR**
S&P 500 ESG Daily Risk Control 5% Index	4.182	8.595	4.413	4.150	
Average	-	-	**4.413**	**4.150**	**4.148**

Source: S&P Dow Jones Indices LLC. Data from July 31, 2022, to July 31, 2023. Index performance based on return in USD. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Examples

In the examples below, we look at indices with an unlevered position, meaning the weight of the underlying assets (including cash) sum to 100%. A levered index would reflect theoretical borrowing of money to invest in non-cash assets, and the weight of those underlying assts would sum to over 100%.

The general rule to keep in mind is that subtracting a theoretical interest rate from the performance of a total return index will give you the return of the excess return index. Likewise, adding an interest rate to the performance of an excess return index will give you the total return. We can move back and forth between index return types using this rule.

S&P 500 Daily Risk Control 5% Index

The S&P 500 Daily Risk Control 5% Index is a multi-asset index composed of two assets: equity and cash. Equity is represented by the S&P 500 TR. To calculate the return of the S&P 500 Daily Risk Control 5% Index TR, Formula 1 is used. It is a weighted return of the S&P 500 TR and cash.

Formula 1: S&P 500 Daily Risk Control 5% Index TR

$$(\text{S\&P 500 Total Return} * \text{Equity Weight}) + ([\text{SOFR} + 0.02963] * \text{Cash Weight})$$

To calculate the S&P 500 Daily Risk Control 5% Index ER, we use the same formula but the interest rate ($\text{SOFR} + 0.02963$) is subtracted from the return of the entire index (i.e., from both the equity and cash allocations). Since the cash component of the index is "earning" the same interest rate that is being deducted, the theoretical return on cash is 0, and the final S&P 500 Daily Risk Control 5% Index ER is left with a non-interest-bearing cash component allocation. The index return formula can be simplified to Formula 2. It is the weighted return of the S&P 500 TR minus the interest rate.

Formula 2: S&P 500 Daily Risk Control 5% Index ER

$$(\text{S\&P 500 Total Return} * \text{Equity Weight}) - ([\text{SOFR} + 0.02963] * \text{Equity Weight})$$

S&P MARC 5% Index

The S&P MARC 5% Index is a multi-asset index composed of four assets: equity, fixed income futures, gold futures and cash.

In contrast to the S&P 500 Daily Risk Control 5% Index TR, the S&P MARC 5% Index TR uses Formula 3 to calculate index performance. It is the weighted return of the underlying **excess** return indices plus a theoretical interest rate on **100%** of the index of index constituents (not just the cash component allocation).

Formula 3: S&P MARC 5% Index TR

(S&P 500 (Fed Funds Rate) Index Excess Return ∗ Equity Weight)

   + (S&P 10-Year U.S. Treasury Note Futures Index Excess Return ∗ Fixed Income Weight)

   + (S&P GSCI Gold Excess Return ∗ Gold Weight) + ([SOFR + 0.02963] ∗ Entire Index Weight)

There are two major differences between the S&P MARC 5% Index TR and S&P Daily Risk Control 5% Index TR.

- All three underlying indices of the S&P MARC 5% Index are calculated on an excess return basis, which is the opposite of the S&P 500 Daily Risk Control 5% Index TR, where the underlying index is the total return version of the S&P 500.

- The interest rate is multiplied by the weight of the entire index constituent portfolio. Since the equity, fixed income and gold components are all represented by excess return indices, an interest rate needs to be **added** to their returns to calculate the total return of the S&P MARC 5% Index. Additionally, like the S&P 500 Daily Risk Control 5% Index, the theoretical return on cash needs to be included in the final calculation. The cash allocation is 100% minus the sum of the three component indices. Therefore, the weight of all index assets including cash is 100% and the entire index portfolio earns interest.

To calculate the S&P MARC 5% Index ER, we use the weighted returns of the three underlying excess return indices and omit the return on cash. The underlying subindices are already excess return, so a weighted average of them will result in an excess return version of the S&P MARC 5% Index.

Formula 4: S&P MARC 5% Index ER

(S&P 500 (Fed Funds Rate) Index Excess Return ∗ Equity Weight)

   + (S&P 10-Year U.S. Treasury Note Futures Index Excess Return ∗ Fixed Income Weight)

   + (S&P GSCI Gold Excess Return ∗ Gold Weight)

Conclusion

Price return, total return and excess return are three return types used in insurance indices. These return types serve different purposes and ultimately are one element to consider as part of the overall index construction.

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