

MSCI DECREMENT INDEXES METHODOLOGY

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1 INTRODUCTION

The MSCI Decrement Indexes (“Indexes”) are designed to represent the performance of a strategy tracking a given MSCI index (parent) from which a pre-determined amount (a ‘synthetic dividend’) is withdrawn periodically. In most cases, the parent index will be a net or gross total return index, which captures the share price movement as well as incorporates the dividends paid by the companies in the index.

Because a Decrement Index deducts a “synthetic dividend” from the performance of the index, it therefore systematically underperforms its parent index. As a result, Decrement Indexes are not designed or intended to be used as the basis for funds, derivatives, structured products or other financial instruments or products that solely aim to replicate the performance of an index.

2 CONSTRUCTING THE MSCI DECREMENT INDEXES

2.1 OVERVIEW

The MSCI Decrement Indexes are designed to represent the performance of a strategy tracking a given MSCI index from which a pre-determined amount ('synthetic dividend') is withdrawn at pre-defined intervals. MSCI calculates the MSCI Decrement Indexes based upon any given MSCI index ("Parent Index").

2.2 DECREMENT TYPE SELECTION

The MSCI Decrement Indexes are calculated in different ways, depending on the choice of:

- Decrement type
- Decrement application
- Decrement frequency
- Currency of calculation
- Day-count convention

2.2.1 DECREMENT TYPE

Decrement Indexes apply a constant or relative performance deduction to the underlying index on a periodic basis. The mark down method used for the construction of MSCI Decrement Indexes is one of the following:

- Fixed Percentage Decrement: A constant percentage of the Parent Index performance is deducted at a pre-defined interval.
- Fixed Index Points Decrement: A constant number of index points are deducted from Parent Index levels at a pre-defined interval.
- Incremental Index Points Decrement: The index points deduction, to be applied to the Parent Index levels, is time-varying with a pre-defined growth rate.

2.2.2 DECREMENT APPLICATION

The algorithm to deduct the decrement types as defined in section 2.2.1 is either:

- Arithmetic Application: The decrement index levels are computed by deducting the index points or percentage points from the underlying Parent Index levels directly.

- Geometric Application: The decrement index replicates the performance of the underlying Parent Index, from which index points or percentage points are subsequently deducted.

2.2.3 DECREMENT TIME AND FREQUENCY

The decrement to the Parent Index may be applied daily, monthly, quarterly, semi-annually or annually.

2.2.4 CURRENCY OF CALCULATION

To calculate decrement indexes in the currency of choice, the Parent Index is first expressed in the target currency and then the decrement is applied to that currency-adjusted Parent Index level. The Decrement Index levels are currency-relative i.e. decrement levels calculated from underlying index expressed in currency A cannot be converted to currency B by simple exchange rate conversion.

2.2.5 DAY COUNT CONVENTION

The day-count convention can either be Actual/360 or Actual/365.

2.3 EXCEPTION HANDLING

As a consequence of a simple decrement application, it is possible that the decrement index level could become negative on a particular day. To guard against this, the decrement is not applied on days when the application of the decrement would otherwise cause the index level to drop to or below zero so that the index levels always remain positive. Alternatively, an index-floor value may be set beyond which the application of the decrement is stopped. Note that the index level may still go below such a floor because of Parent Index performance.

2.4 DECREMENT CALCULATION FORMULAE

The different variations of the decrement application as defined in section 2.2 use different formulas and equations for index level calculations.

2.4.1 FIXED PERCENTAGE DECREMENT

Frequency: Daily

- Geometric Decrement Calculation:

$$DI_t = DI_{t-1} * \left(\frac{U_t}{U_{t-1}} - c * \frac{ACT(t-1,t)}{DayCount} \right)$$

- Arithmetic Decrement Calculation:

$$DI_t = DI_{t-1} * (U_t * (1 - c * \frac{ACT(t=0,t)}{DayCount})) / (U_{t-1} * (1 - c * \frac{ACT(t=0,t-1)}{DayCount}))$$

Frequency: Monthly/Quarterly/Semi-Annual/Annual

- Geometric Decrement Calculation:

$$DI_t = DI_{t-1} * \frac{U_t}{U_{t-1}}$$

On non-decrement days

$$DI_t = DI_{t-1} * \left(\frac{U_t}{U_{t-1}} - c * \frac{ACT(Q-1,Q)}{DayCount} \right)$$

On decrement days

where *c* is a specified fixed percentage deduction

Note: The fixed percentage decrement is not available for arithmetic decrement calculations with less frequent adjustments than daily.

2.4.2 FIXED INDEX POINT DECREMENT

Frequency: Daily

- Geometric Decrement Calculation:

$$DI_t = DI_{t-1} * \frac{U_t}{U_{t-1}} - c \frac{ACT(t-1,t)}{DayCount}$$

- Arithmetic Decrement Calculation:

$$DI_t = DI_{t-1} * (U_t - c * \frac{ACT(t=0,t)}{DayCount}) / (U_{t-1} - c * \frac{ACT(t=0,t-1)}{DayCount})$$

Frequency: Monthly/Quarterly/Semi-Annual/Annual

- Geometric Decrement Calculation:

$$DI_t = DI_{t-1} * \frac{U_t}{U_{t-1}}$$

On non-decrement days

$$DI_t = DI_{t-1} * \frac{U_t}{U_{t-1}} - c \frac{ACT(t-1,t)}{DayCount}$$

On decrement days

where c is fixed index points deduction

Note: The fixed index point decrement is not available for arithmetic decrement calculations with less frequent adjustments than daily.

2.4.3 INCREMENTAL INDEX POINT DECREMENT: COMPOUNDED GROWTH

Frequency: Daily growth in index point decrement

- Geometric Decrement Calculation:

$$DI_t = DI_{t-1} * \frac{U_t}{U_{t-1}} - c_t * \frac{ACT(t-1,t)}{DayCount}$$

where:

$$c_t = c_{t-1}(1 + g)^{\frac{ACT(t-1,t)}{DayCount}}$$

g is the rate of growth of decrement per year

Frequency: Monthly/Quarterly/Semi-Annual/Annual growth in index point decrement

- Geometric Decrement Calculation:

$$DI_t = DI_{t-1} * \frac{U_t}{U_{t-1}} - c_t * \frac{ACT(t-1,t)}{DayCount}$$

where:

$$c_t = c_{t-1} \quad \text{when no growth in decrement}$$

$$c_t = c_{t-1}(1 + g)^{\frac{ACT(Q-1,Q)}{DayCount}} \quad \text{when applying growth in decrement}$$

g is the rate of growth of decrement per year

c_t is the decrement point to be deducted on day *t*

Note: Incremental index point decrement with compounded growth is not applicable for arithmetic calculations.

2.4.4 INCREMENTAL INDEX POINT DECREMENT: MULTIPLICATIVE GROWTH

Frequency: Daily

- Geometric Decrement Calculation:

$$DI_t = DI_{t-1} * \frac{U_t}{U_{t-1}} - c_t * \frac{ACT(t-1,t)}{DayCount}$$

where:

$$c_t = c * \max(1, \frac{DI_{t-1}}{DI_{t=0}})$$

c_t is the decrement point to be deducted on day t

Note: Incremental index point decrement with multiplicative growth is only applicable for geometric calculations on daily frequencies.

For all the equations above, we used the following notation:

DI_t = Decrement Index Value on day t

U_t = Index Value of the underlying Parent Index on day t

$ACT(t - 1, t)$ = number of actual calendar days between day t-1 and t (1 over weekdays and 3 over weekends)

$DayCount$ = 360 or 365

Q = Current Month/Quarter/Semi-Annual/Annual end date (or previous business day if Month/Quarter/Semi-Annual/Annual end date coincides with a weekend)

$Q - 1$ = Previous Month/Quarter/Semi-Annual/Annual end date (or previous business day if Month/Quarter/Semi-Annual/Annual end date coincides with a weekend)

3 MAINTAINING THE MSCI DECREMENT INDEXES

The MSCI Decrement Indexes are derived from the existing underlying MSCI Parent Indexes. As a result, corporate events are reflected in the MSCI Decrement Indexes as they occur and as they are captured in the underlying MSCI Parent Indexes.

The following sections have been modified since May 2018:

Update to the Introduction section to explain performance of decrement indexes and clarify their use case.

Update to Section 2.4 (Decrement Calculation Formulae) to clarify formula used in calculation of Decrement Indexes.

The following sections have been modified since November 2018:

Update to the Introduction section to provide more details on the use-case of the MSCI Decrement Indexes

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