

# MSCI WORLD CUSTOM RISK CONTROL 10% INDEX METHODOLOGY

May 2015

**CONTENTS**

1	INTRODUCTION .....	3
2	VOLATILITY ESTIMATION .....	4
3	PARAMETERS .....	5

## 1 INTRODUCTION

The MSCI World Custom Risk Control 10% Index (the “Index”) aims replicate the performance of an investment strategy that targets a specific level of risk by varying its exposure between cash and the MSCI World index (the “Parent Index”). The methodology is based on the MSCI Risk Control Index methodology<sup>1</sup> with customized exponential weighted volatility estimation. The sections below describe the volatility estimation as well as the parameters specific to the MSCI World Custom Risk Control 10% Index. All other index construction and maintenance rules are as per the MSCI Risk Control Index methodology.

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<sup>1</sup> <https://www.msci.com/index-methodology>

## 2 VOLATILITY ESTIMATION

The leverage applied in the Index is determined based on customized exponential weighted volatility estimation. The realized volatility  $RV_T$  on date T is the maximum of the long term and short term realized volatilities of the Parent Index on date T calculated using the exponential weighted methodology and is calculated as follows:

$$\begin{aligned}\sigma_{ST,T}^2 &= \lambda_{ST}\sigma_{ST,T-1}^2 + (1 - \lambda_{ST})r_{T-i}^2 \\ \sigma_{LT,T}^2 &= \lambda_{LT}\sigma_{LT,T-1}^2 + (1 - \lambda_{LT})r_{T-i}^2\end{aligned}$$

where,

$\sigma_{ST,T}^2$  and  $\sigma_{LT,T}^2$  are short term and long term realized volatilities respectively for day T

$\sigma_{ST,T-1}^2$  and  $\sigma_{LT,T-1}^2$  are short term and long term realized volatilities respectively for day T-1

$\lambda_{ST}$  and  $\lambda_{LT}$  are short term and long term decay factors respectively

“i” is the number of days lagged return for computing volatility

$r_{T-i}$  is the daily log return of the index on “T-i” day (in the defined variant and currency)

The variance on day T is dependent on the initial estimate of variance which can either be user defined or computed using the formula below:

$$\begin{aligned}\sigma_{ST,T_{ini}+1}^2 &= (1 - \lambda_{ST}) \sum_{j=1}^{T_{ini}} \lambda_{ST}^{(T_{ini}-j)} r_j^2 \\ \sigma_{LT,T_{ini}+1}^2 &= (1 - \lambda_{LT}) \sum_{j=1}^{T_{ini}} \lambda_{LT}^{T_{ini}-j} r_j^2\end{aligned}$$

Where  $T_{ini}$  is the number of days for calculating initial volatility estimate.

### 3 PARAMETERS

The following parameters are used in the calculation of the Index

	MSCI Risk Control Index Methodology Parameters	
1	MSCI Parent Index	MSCI World Index
2	Cash Component	3 Month USD LIBOR
3	Base Currency of MSCI Parent Index and Cash Component	USD
4	Specific Risk Level	10%
5	Short term decay factor ( $\lambda_{ST}$ )	94%
6	Long term decay factor ( $\lambda_{LT}$ )	97%
7	Number of days for calculating initial volatility estimate ( $T_{ini}$ )	260
8	Number of days lagged return for computing volatility (i)	0
9	Maximum Leverage	150%
10	Turnover Buffer	5%
11	Exchange Holiday Rule Threshold	10%
12	Lag between Rebalancing Date and Effective Date	2 business days

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