T3 SPIKE Front 2 Futures Index (SPKF)

Index Methodology Guide

April 2022

Introduction

The **T3 SPIKE Front 2 Futures Index** (referred to as the "SPIKES Futures Short-Term Index") series measures the performance of holding long positions in SPIKE futures contracts, defined as follows.

The **T3 SPIKE Front 2 Futures Index** measures the return from a rolling long position in two SPIKE futures contracts with the two nearest monthly maturities. The index rolls continuously throughout each month from the 1st monthly SPIKE futures contract into the 2nd monthly SPIKE futures contract.

Index Construction – General Formulation

For the purpose of this discussion, we will focus on the calculation of the Excess Return index. Extension to the Total Return index is trivial and will be omitted.

The following is the standard method used to calculate a volatility futures based index, variations of which are tracked by a plethora of popular volatility ETPs. On each day *t* the index is updated via

$$\text{Index}_t = \text{Index}_{t-1} \times (1 + r_t)$$

Return of the index on day *t* is given by

$$r_t = \frac{\sum_{i=m}^{n} w_{i,t-1} p_{i,t}}{\sum_{i=m}^{n} w_{i,t-1} p_{i,t-1}} - 1$$

Here $w_{i,t}$ and $p_{i,t}$ (*i* = *m* to *n*) are respectively the weight and price of the i^{th} SPIKE monthly futures contract on date *t*. Each month the roll from the m^{th} SPIKE futures contract to the n^{th} contract starts on the monthly SPIKE futures settlement date, and continues until the day prior to the following month's SPIKE futures settlement date. And the process repeats thereafter.

On day *t* the weight for each of the SPIKE futures contract within the index is given by

$$w_{m,t} = \frac{k_t}{N}, \quad w_{n,t} = \frac{N - k_t}{N} \quad \text{and} \quad w_{i,t} = 1 \text{ for all } i \text{ between } m \text{ and } n$$

Here *N* is the total number of business days in the current roll period. It stays constant irrespectively of unforeseen market closure or new holidays. And k_t is the number of business days remaining in the roll period, excluding the current business day but taking any new holidays into consideration.

On the day prior to the monthly SPIKE futures settlement date, which corresponds to the start of a new roll period, an equal weight is allocated to the m^{th}, $(m+1)^{th}$, …, and $(n-1)^{th}$ monthly contracts. Then on each subsequent business day a fraction of the m^{th} monthly SPIKE futures holding is closed out, and an equal amount of the n^{th} monthly SPIKE futures holding is established. The initial position in the m^{th} monthly contract is progressively moved to the n^{th} monthly contract over the course of the month, until the end of the current roll period when the old $(m+1)^{th}$ monthly SPIKE futures contract becomes the new m^{th} monthly SPIKE futures contract, and the old $(n+1)^{th}$ monthly contract becomes the new n^{th} monthly contract. Then the process repeats again.

For the **T3 SPIKE Front 2 Futures Index**, we have $m = 1$ and $n = 2$.

The table below shows the weights for the relevant monthly SPIKE futures contracts for a roll period of 20 business days:

k_t	20	19	18	17	…	2	1	0
$w_{m,t}$	1.0	0.95	0.9	0.85	…	0.1	0.05	0.0
$w_{m+1,t}$	1.0	1.0	1.0	1.0	…	1.0	1.0	1.0
… …								
$w_{n-1,t}$	1.0	1.0	1.0	1.0	…	1.0	1.0	1.0
$w_{n,t}$	0.0	0.05	0.1	0.15	…	0.9	0.95	1.0

In this typical example, from a portfolio replication point of view, a common misinterpretation is that on each day, 5% of the original allocation in the m^{th} monthly SPIKE futures contract is rolled into the n^{th} monthly contract. In fact, we need to first calculate the total number of contracts in the portfolio based on the latest prices, before allocating the appropriate portion to each SPIKE futures expiration. More specifically, the following relation holds:

Total Number of Contracts = Portfolio Value / Weighted Futures Price / Futures Multiplier

where Weighted Futures Price = $\sum_{i=m}^{n} w_{i,t} p_{i,t}$