3.1 Variables and Events definition

In this Section we define the variables and the events used to describe and implement the dynamic methodology of the AMPI. Even if it is not strictly required, the methodology expects to start at a date t for which the equity index (MSCI World Index) is at its maximum and the expected implied volatility is low. Therefore we proceed with the following definitions and notations.

- We denote with $\{I_t\}_{t \geq 0}$ the time series of the closing prices of the equity index (which we assume corresponds to the investment used in the equity sub-portfolio) and we define the drawdown process $\{D(s)\}_{s \geq 0}$ as

$$D(s) = \left(\max_{t \in [0,s]} I_t - I_s \right) / \max_{t \in [0,s]} I_t.$$

  A date s such that $D(s) = 0$ means that the equity index is at its maximum level since $t = 0$ or since a previous equal maximum.

- We define lfv_t as the *low future volatility* event at date t. lfv_t is realized and equal to TRUE (FALSE) if, at date t, the closing price of the first VIX future contract is less or equal 18 (greater than 18), i.e. if

$$Fut^{VIX}_{1M,t} \leq 18 \, (Fut^{VIX}_{1M,t} > 18).$$

  The lfv_t event is used in order to determine the rebalancing strategy to use on the VIX derivartives sub-portfolio Dv at date t.

- We define Dv_lw_t as the *VIX Derivatives sub-portfolio low weight* event at date t. Dv_lw_t is realized and equal to TRUE (FALSE) if, at date t, the weight of the Dv sub-portfolio lower(greater) than 4%.

- We define Dv_hw_t as the *VIX Derivatives sub-portfolio high weight* event at date t. Dv_hw_t is realized and equal to TRUE (FALSE) if, at date t, the weight of the Dv sub-portfolio greater(lower) than 8%.

- We define $Rollday_t$ as the *rollday of CBOE Market* event at date t. $Rollday_t$ is TRUE if t is a rollday of CBOE Market, i.e. the day of futures expiry, $Rollday_t$ is FALSE otherwise.

- We are ready to define the starting date t_0 of the Alpha Moderate Portfolio Index: the starting date of the AMPI, denoted by t_0, is a date such that

  - $D(t_0) = 0$
  - $lfv_{t_0} = TRUE$.

We then set the initial value of the AMPI to an arbitrary positive fix amount denoted by V_0. The following variables are defined:

ref_portfolio_nav is a variable initially (at time $t = t_0$) equal to V_0. This variable is used in order to compute the new desired exposure of the equity sub-portfolio when particular events occur. This variable is updated constantly.