

Job #1

MT5 Custom Indicator – Market Structure Indicator

1. Swing high & low identification



1. Swing high & low identification

Methodology:

- The EMA line acts as a filter to identify and confirm valid swing points.
- A swing high or swing low is confirmed only when the price crosses the EMA.
- Before a cross occurs, no swing point is considered confirmed.
- Upon crossing the EMA, the highest or lowest price before the crossover is marked as the confirmed swing high or swing low.

Required Input Parameters for the Indicator:

1. EMA Lookback Period

- Defines the number of periods used to calculate the Exponential Moving Average (EMA).
- The EMA acts as a dynamic filter for identifying and confirming valid swing points.

2. BOS

Break of Structure (BOS) Identification:

- Once swing high and swing low points are confirmed, we move on to identifying a Break of Structure (BOS).
- A BOS occurs when the price breaks above a previous swing high or below a previous swing low.
- To ensure the break is genuine and not just volatility, an ATR-based volatility filter is applied.
- A BOS is confirmed as soon as the price crosses beyond the volatility filter value—**candle closure is NOT required**.

Illustration of Break of Structure (BOS):

- The attached images provide visual examples of how a BOS is identified.
- We assume the BOS levels shown in the illustrations already account for the ATR-based volatility filter.
- In the images:
 - **Upward pivots** represent confirmed swing highs.
 - **Downward pivots** represent confirmed swing lows.

Required Input Parameters for the Indicator:

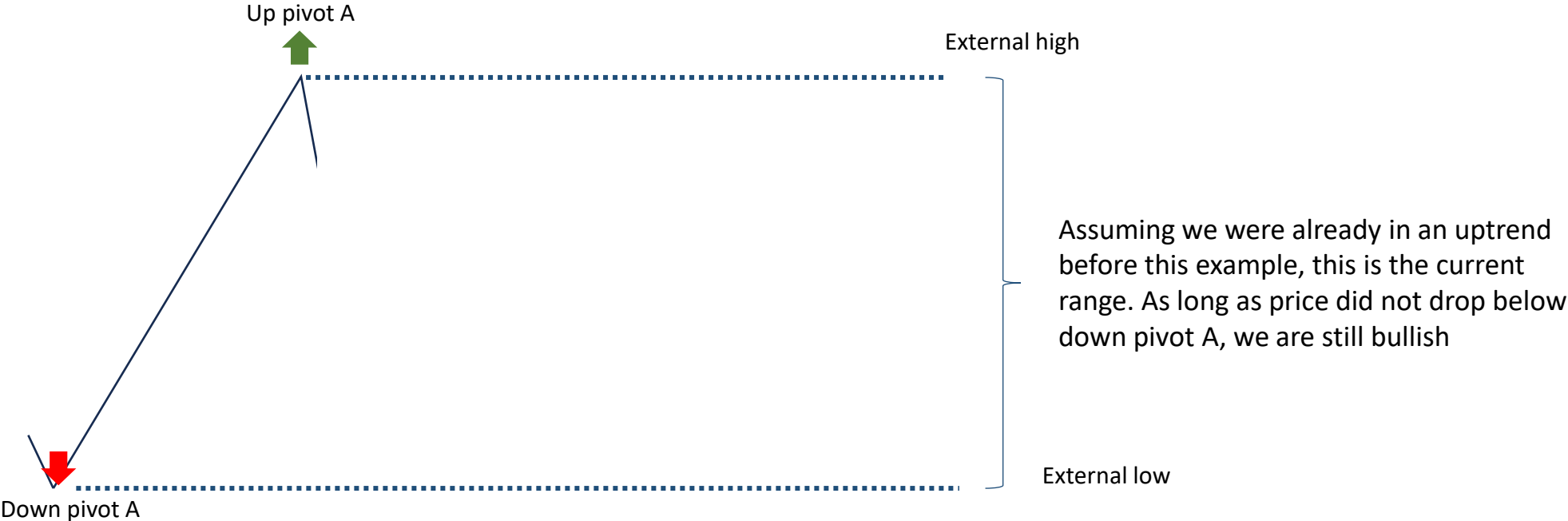
1. ATR-Based Volatility Filter – ATR Lookback Period

1. Defines the number of periods used to calculate the Average True Range (ATR).
2. This helps in determining the volatility threshold for confirming a Break of Structure (BOS).

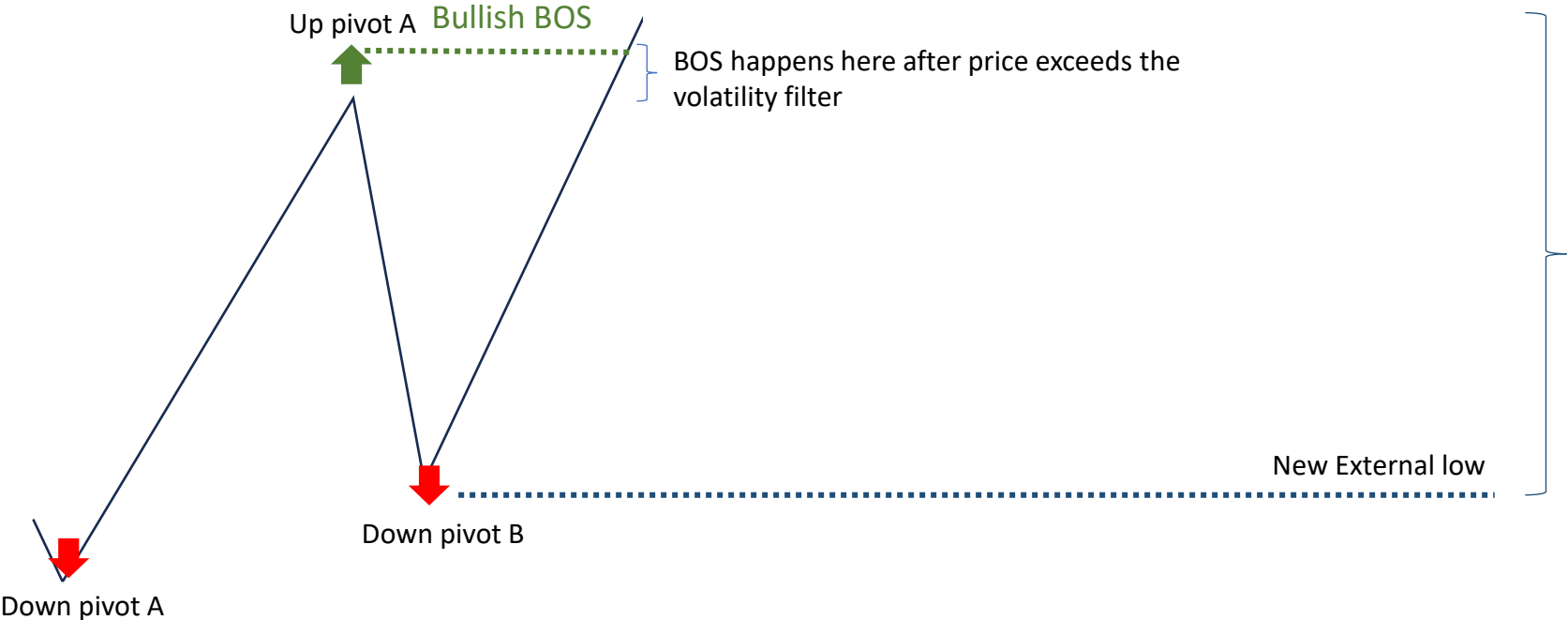
2. ATR-Based Volatility Filter – Ratio

1. A multiplier applied to the ATR value to set the required price distance for confirming a BOS.
2. Ensures that minor price fluctuations due to volatility are filtered out, only recognizing significant structure breaks.

Appendix 1



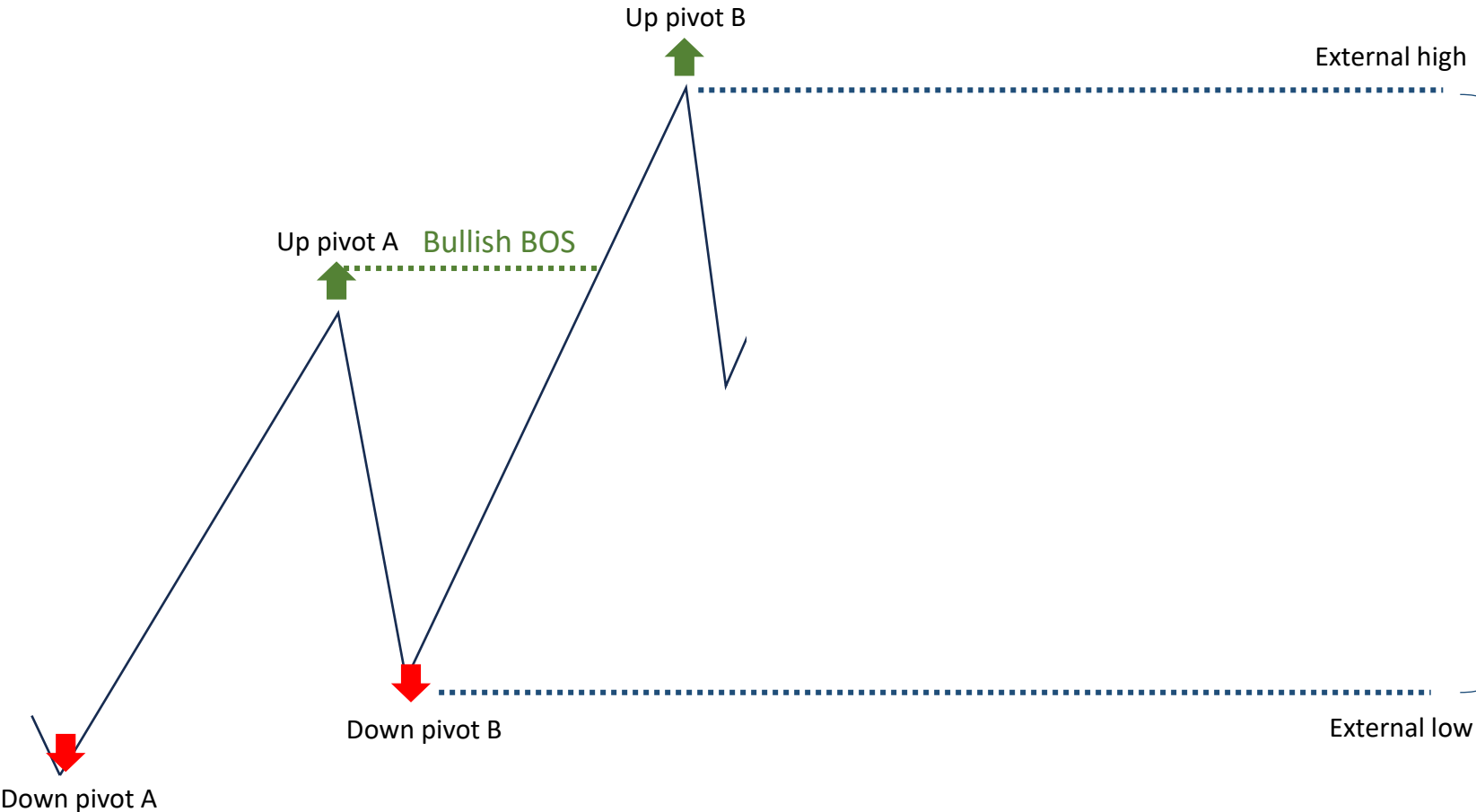
Appendix 2



Updating Swing Points After a BOS:

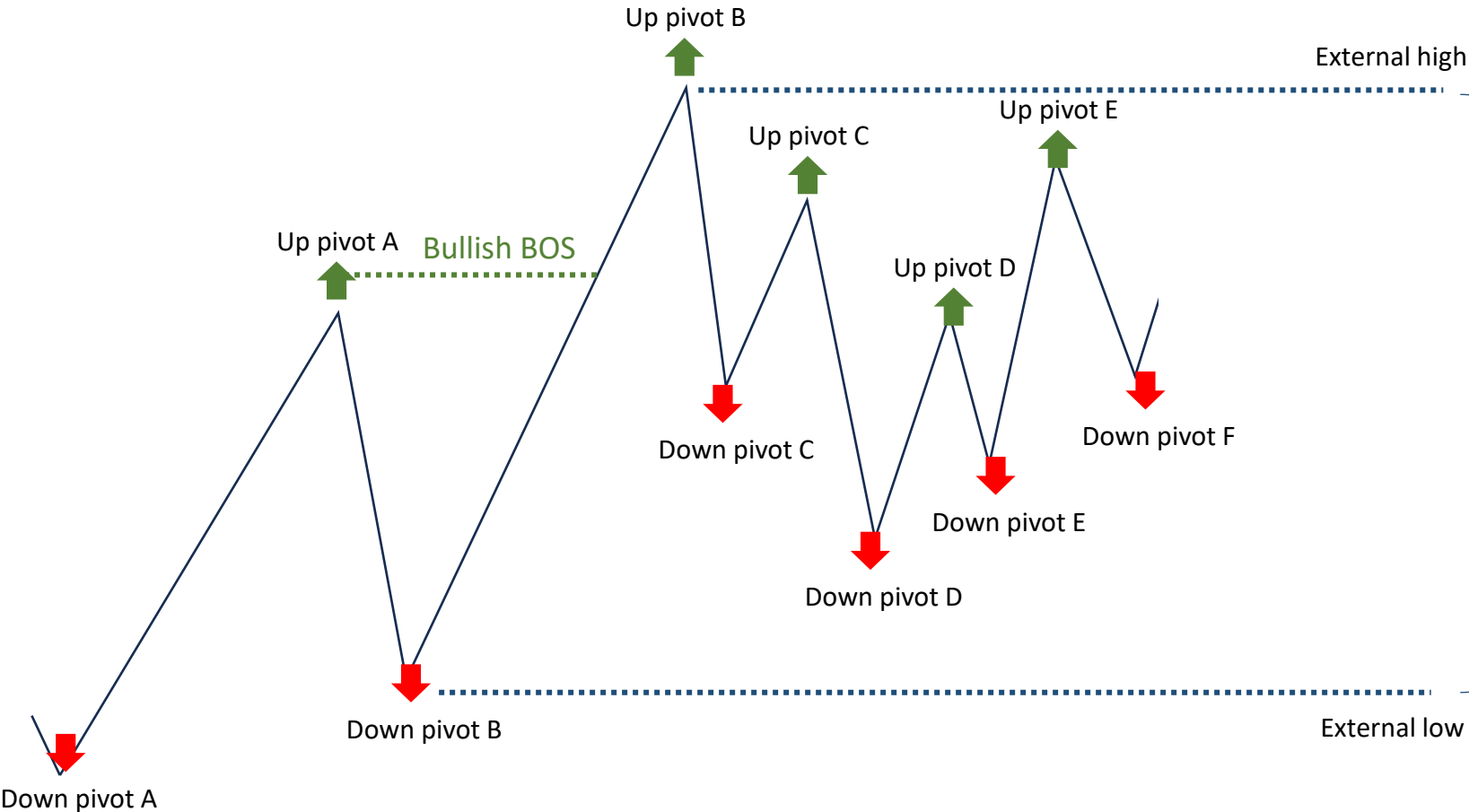
- When the price moves above the up pivot and exceeds the ATR-based volatility filter, a Break of Structure (BOS) is confirmed.
- As a result, the new swing low is updated from down pivot A to down pivot B.
- The swing high remains unconfirmed and continues developing.
- A new swing high is only recorded once the price crosses back below the EMA line.

Appendix 3



- When the price reverses and crosses below the EMA line, a valid swing high is confirmed.
- At this point, up pivot B is marked as the new swing high, while down pivot B remains the swing low.
- This establishes the current trading range between these two points.
- As long as the price does not break above the swing high or below the swing low, the market is still considered to be in a bullish trend.

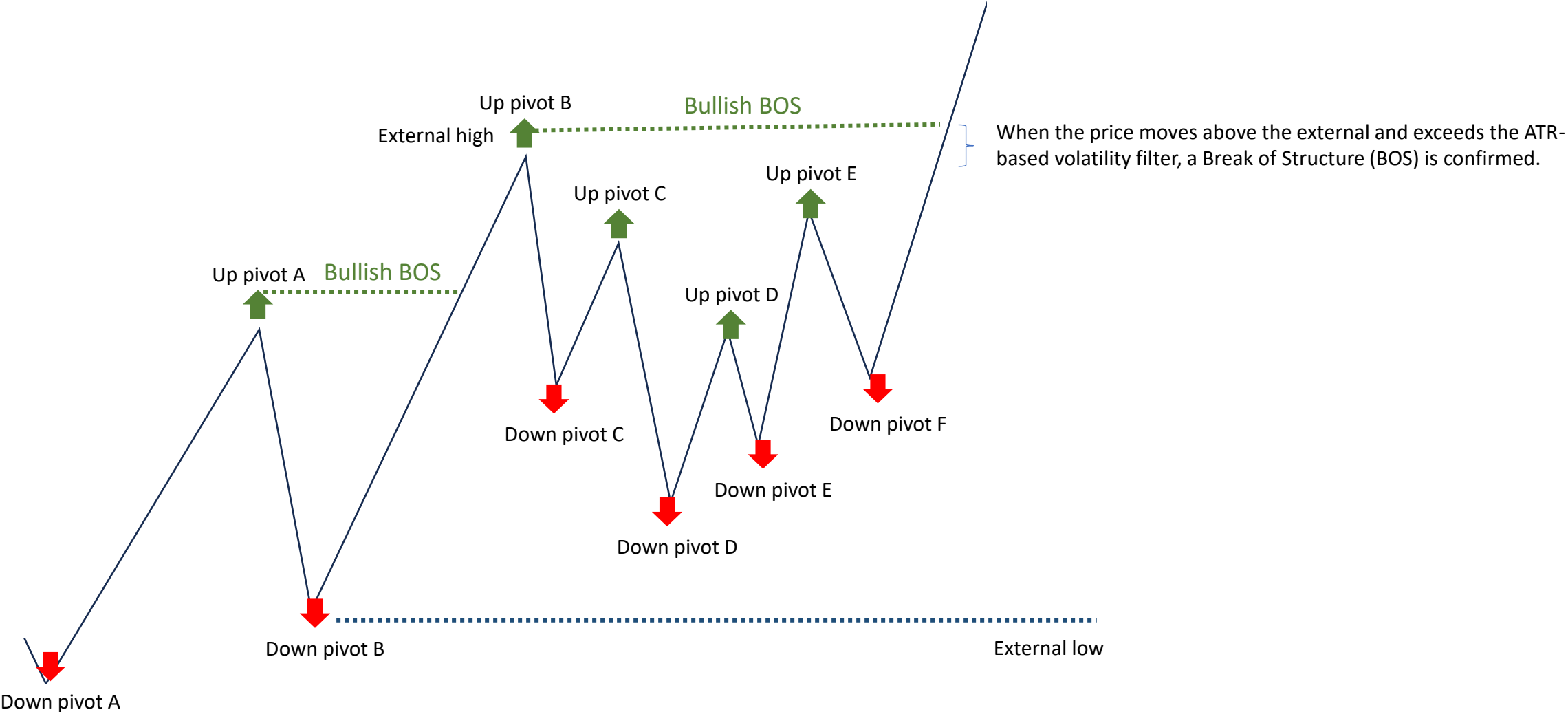
Appendix 4



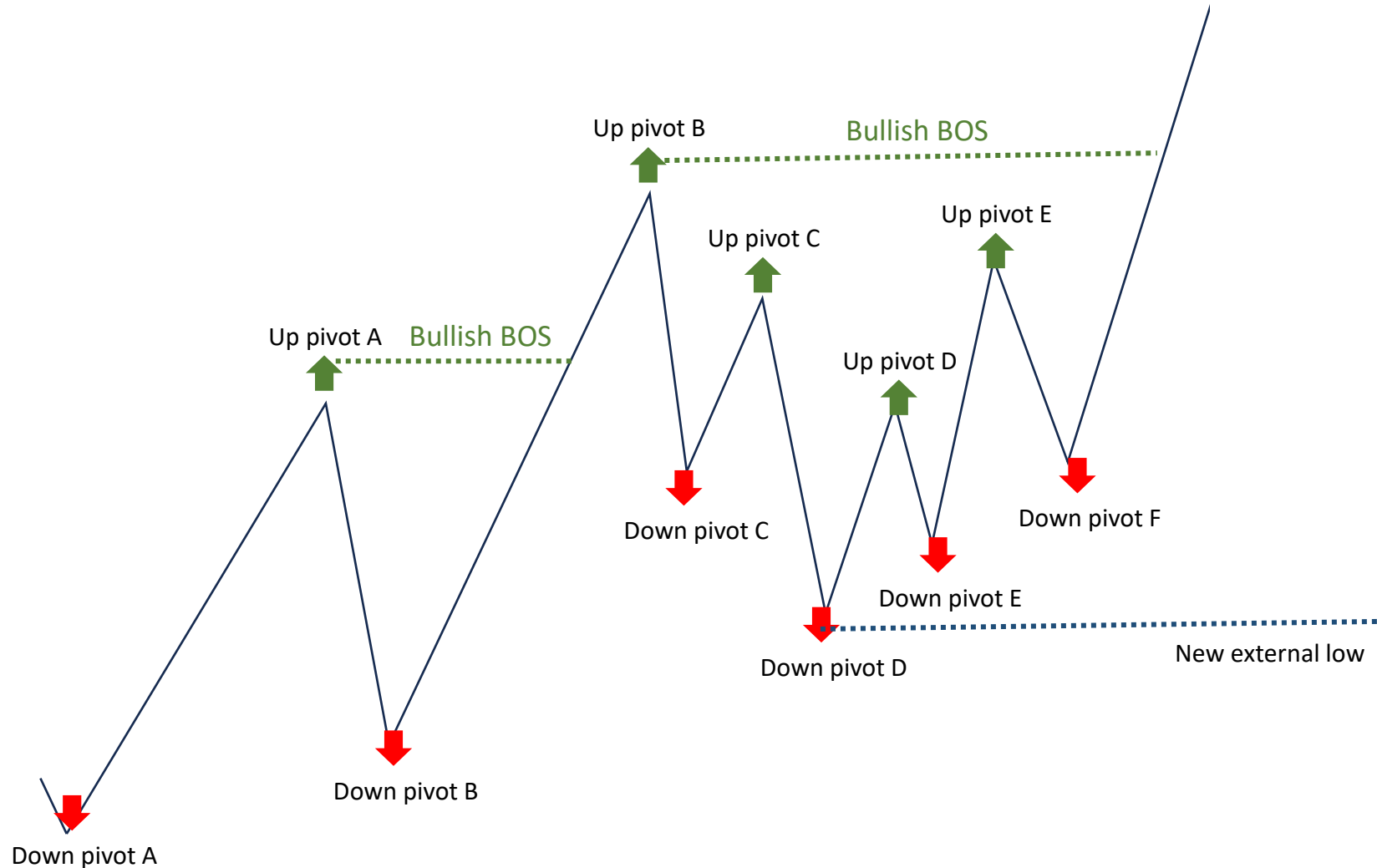
Internal Swings Within the Trading Range:

- When the price moves sideways, it may cross above and below the EMA multiple times, forming new swing highs and swing lows.
- However, as long as these swings remain within the current trading range (between up pivot B and down pivot B), they are considered internal swings.
- Internal swings do not affect the overall trend direction until a Break of Structure (BOS) occurs by breaking above the swing high or a CHOC , when price breaks below the swing low

Appendix 5



Appendix 5



Updating Swing Points After a BOS:

- When a BOS happens, we now need to move our swing low point up to reflect a new trading range
- The new swing low is moved up from down pivot B to down pivot D
- The swing high remains unconfirmed and continues developing.
- A new swing high is only recorded once the price crosses back below the EMA line.

Important Note on Swing Low Selection:

- The valid swing low pivot in this scenario is down pivot D, NOT down pivot F.
- The indicator must correctly reflect down pivot D as the swing low because it represents the lowest low within the internal range before a Break of Structure (BOS) occurs.

3. CHOC

Change of Character (CHoC) Identification:

- A Change of Character (CHoC) occurs when the external high or external low of the trading range is broken in the opposite direction.
- To ensure the break is genuine and not just volatility, an ATR-based volatility filter is applied.
- A CHoC is confirmed as soon as the price crosses beyond the volatility filter value—candle closure is NOT required.

Illustration of Change of Character (CHoC):

- The attached images provide visual examples of how a CHOC is identified.
- We assume the CHOC levels shown in the illustrations already account for the ATR-based volatility filter.
- In the images:
 - **Upward pivots** represent confirmed swing highs.
 - **Downward pivots** represent confirmed swing lows.

Required Input Parameters for the Indicator:

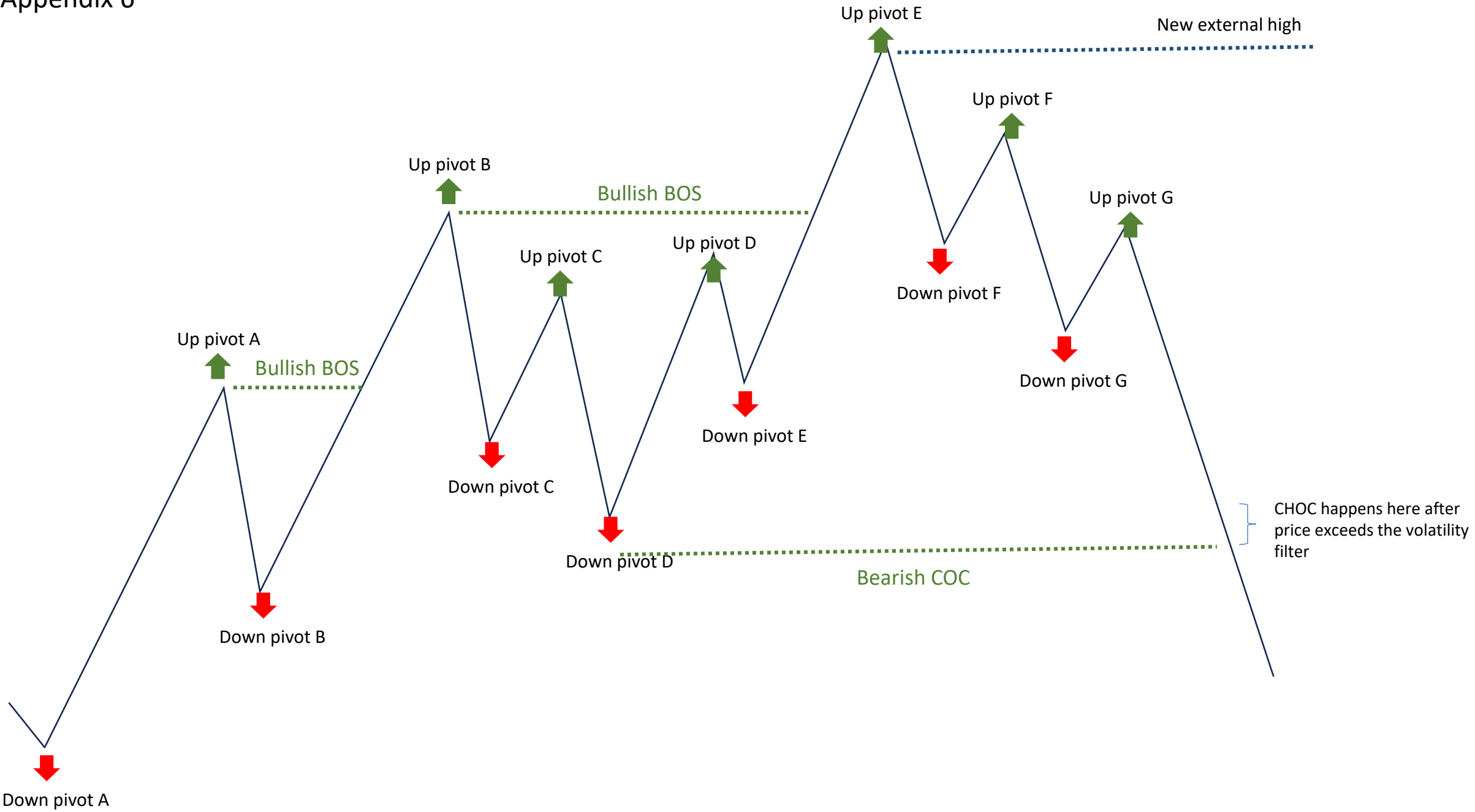
1. ATR-Based Volatility Filter – ATR Lookback Period

1. Defines the number of periods used to calculate the Average True Range (ATR).
2. This helps in determining the volatility threshold for confirming a **Change of Character (CHoC)**

2. ATR-Based Volatility Filter – Ratio

1. A multiplier applied to the ATR value to set the required price distance for confirming a CHOC.
2. Ensures that minor price fluctuations due to volatility are filtered out, only recognizing significant structure breaks.

Appendix 6



Appendix 6:

Change of Character (CHoC) Confirmation & New Trading Range Establishment:

- The price has reversed downward, breaking the external low (down pivot D) and exceeding the ATR-based volatility filter, confirming a valid CHoC.
- As a result, the market structure has shifted, and we are now in a downtrend.
- A new trading range is established:
 - The previous external high (up pivot E) now acts as the new external high.
 - As long as the price does not break above up pivot E, the downtrend remains intact.
- The new swing low is still developing and will only be confirmed once the price crosses back above the EMA line.

Job #2

MT5 EA – Market Structure EA

Trading strategy overview:

- The strategy involves identifying the market structure on the lower timeframe (LTF) while aligning with the higher timeframe (HTF) trend.
- A Change of Character (CHoC) on the LTF back in the direction of the HTF trend signals a potential trade opportunity.
- When this CHoC occurs, a new trade sequence is initiated, assuming the market is resuming the HTF trend after a temporary pullback or consolidation.
- Trade sequence here consist of:
 - Primary Orders – The main trades executed in the direction of the higher timeframe (HTF) trend after a valid CHoC on the lower timeframe (LTF).
 - Partial Hedge Orders – Smaller counter-trend trades
- My trade management rules consist of:
 - Grid Trading: Orders are placed at predefined levels to improve the average entry price using a dollar-cost averaging (DCA) approach.
 - Stop Loss (SL) for the Entire Trade Sequence: A fixed SL is applied to the entire trade sequence, ensuring a controlled maximum loss.
 - Hedging Order Take Profit: Partial hedge orders have their own predefined take profit levels to systematically capture profits from counter-trend movements while allowing the primary trend trade to remain active.
 - Partial Take Profit: Once the primary orders target profit is reached, a certain amount of orders will be closed i.e 50%

Trading strategy detailed:

Market Structure & Trend Identification

- Trading Direction: All trades will be executed in the direction of the higher timeframe (HTF) trend.
- HTF Trend Identification: The trend is determined using the RSI indicator, based on whether it crosses above or below the 50 level:
 - $RSI > 50 \rightarrow$ Uptrend
 - $RSI < 50 \rightarrow$ Downtrend
- Entry Timeframe: Trades are executed on the lower timeframe (LTF). The Change of Character (CHoC) on the LTF is used as the signal for entry, aligning with the HTF trend.
- Required Input Parameters:
 - HTF filter – Choose to have a HTF filter or without a HTF filter
 - HTF Selection – Choose from available higher timeframes: H1, H4, D1, W1.
 - HTF RSI Lookback Period – Defines the number of periods for calculating the RSI on the HTF.
 - LTF Selection– Choose from available lower timeframes: M1, M5, M15, M30, H1, H4.
 - LTS Directional selection – Choose between bullish or bearish direction only

Entry Conditions & Trade Execution

1. Entry Trigger:

- A Change of Character (CHoC) on the lower timeframe (LTF) in the direction of the higher timeframe (HTF) trend serves as the entry condition.
- The market structure used for identifying CHoC is based on the previously developed indicator.

2. Entry Level:

- The exact entry level is set XX number of pips above/below the CHoC level, where XX is defined by an ATR-based multiplier.
- Once this entry level is crossed, the EA will initiate the 1st market order and set up the entire trade sequence.

3. Trade Sequence Components:

- Primary Orders:
 - If the HTF trend is bullish, the EA places an initial buy market order, followed by multiple pending buy limit orders at predefined levels (refer to below explanation).
 - If the HTF trend is bearish, the EA places an initial sell market order, followed by multiple pending sell limit orders.
- Partial Hedge Orders:
 - Hedge orders are placed using sell stops in a bullish trend (to hedge long positions) and buy stops in a bearish trend (to hedge short positions).
 - These hedge orders are activated at the same levels as the pending limit orders.
 - The first market order will NOT have a partial hedge order.

4. Stop Loss (SL) Strategy:

- A hard stop loss (SL) is placed XX number of pips beyond the external swing low (for buys) or external swing high (for sells).
- This SL distance is defined by an ATR-based multiplier to ensure adaptation to market volatility.

Required Input parameters:

1. Entry Level Offset: ATR-based multiplier to determine the entry price relative to the CHoC level
2. SL Level Offset : ATR-based multiplier to determine the SL beyond the external swing point
3. Partial Hedge Orders lot size: Multiplier based on the primary lot size

So how do we define the number of grid & the grid level itself?

1. Number of grid levels: This is input by the user

2. Grid level calculation:

- The grid levels determine where primary limit orders and hedge orders will be placed.
- These levels are defined based on the gap between the 1st market order and the stop loss (SL).
- The total gap is divided by the number of grid levels specified by the user.
- Formula for Grid Level Spacing: $\text{Grid Size} = (\text{Entry Price} - \text{SL}) / \text{Number of Grid Levels}$
- In a bullish trend, buy limit orders and sell stop (hedge) orders will be placed at each grid level below the entry price.
- In a bearish trend, sell limit orders and buy stop (hedge) orders will be placed at each grid level above the entry price.

Example:

1.If the entry price is 1.2000 and the SL is 1.1900, the total gap is 100 pips.

2.If the user inputs 5 grid levels, each grid level will then be 20 pips apart (100 pips / 5 level = 20 pips per level)

3.The pending buy limit orders (for a bullish trend) will be placed at 1.1980, 1.1960, 1.1940, 1.1920, and 1.1900.

4.The sell stop (hedge) orders will be placed at the same levels as the buy limits.

Required Input parameters:

1. Number of grid levels: User input

Take Profit & Exit Strategy

1. Primary Orders will be closed based on the following conditions:

- Partial Take Profit:
 - A portion of the positions is closed when the price reaches a predefined profit target, starting with those positions with the least profit / in a loss
 - The number of position to close is based on the user input
 - The profit target is based on user input
- Change of Character (CHoC):
 - If a valid CHoC occurs in the opposite direction, signaling a potential trend reversal, all remaining primary orders are closed.
- Stop Loss (SL) is Hit:
 - If the price moves against the trade and reaches the predefined hard SL level, the entire trade sequence is closed.

2. Hedge Orders will be closed based on the following conditions:

- Take Profit at the Next Grid Level:
 - When a hedge order reaches the next grid level, it is closed for profit.
 - Example:
 - If a sell stop hedge order is placed at 1.1950, and the next grid level is 1.1930, the hedge order will be closed when the price reaches 1.1930, securing profit.
- Closed when the primary orders are closed, either because of trend change (CHOC) or hitting SL

How do we calculate our profit target

The target profit is based on achieving \$XX amount of profit, based on average price target of the entire active basket of trades. We use average weighted price as the average price, meaning taking lot sizes into consideration when calculating the average price

Required Input Parameters:

1. Partial Take Profit Target: This is in dollar absolute amount
2. Lot Size Reduction for partial take profit: User-specified percentage i.e 50%
3. Option to Move SL to Breakeven: A toggle option that allows the EA to automatically adjust all active & pending orders SL to breakeven once the first partial take profit target is hit.

Risk Management

1. Primary Lot Size Calculation:

- The lot size per grid level is calculated based on the following user inputs:
 - Stop Loss (SL) Pip Size (as defined in Slide 17).
 - Number of Grid Levels (as defined in Slide 18).
 - Risk Per Trade Sequence (absolute \$ amount): This is a user-defined amount that represents the maximum loss per trade sequence.
- Lot Size per Grid = Risk Per Trade Sequence / (SL in pips × PipValue × Number of Grids)
- *A question here: "Can we implement lot size multiplier, where the deeper grid levels has higher lot size, to make DD recovery faster?"*

2. Hedge Lot Size Calculation:

- The hedge lot size is calculated as a percentage of the primary lot size (refer to slide 17 -> user-defined, e.g., 50%).
- Example: If the primary lot size per grid is 0.10 lots and the hedge percentage is 50%, then each hedge order will be 0.05 lots.
- Important Note:
 - As mentioned in Slide 17, the 1st primary order will NOT have a hedge order.
 - Hedge orders are only activated for pending limit orders.

3. SL placement:

- Please refer to slide 17

4. Trade Execution Restriction for Large SL Gaps:

- If the calculated lot size per grid level falls below the minimum allowed trading size (0.01 lot) due to an excessively large SL gap, the EA will not execute the trade sequence.
- This safeguard prevents trades where the minimum position size is too small, ensuring that risk management stays within the user-defined risk per trade sequence.

Required Input Parameters:

1. Risk Per Trade Sequence (\$ Amount) – Maximum dollar amount risked per full trade sequence.
2. Hedge Lot Size Percentage – User-defined percentage of the primary lot size for hedge orders.
3. Option to Enable/Disable Hedge Orders – Toggle to activate or deactivate hedge trading.
4. Minimum Allowed Lot Size per Grid – Default is 0.01 lot, but allow customization for brokers with different requirements.
5. Enable/Disable SL Gap Check – A toggle to activate or deactivate this filter.

Illustration Overview

The following slides will visually represent a typical trade development, covering key aspects such as:

1.Entry Execution:

1. Identifying the Change of Character (CHoC) on the Lower Timeframe (LTF) in alignment with the Higher Timeframe (HTF) trend.
2. Determining the entry level based on the ATR-based volatility filter.
3. Execution of the first market order and placement of grid-based pending orders & hedge orders.

2.Trade Management:

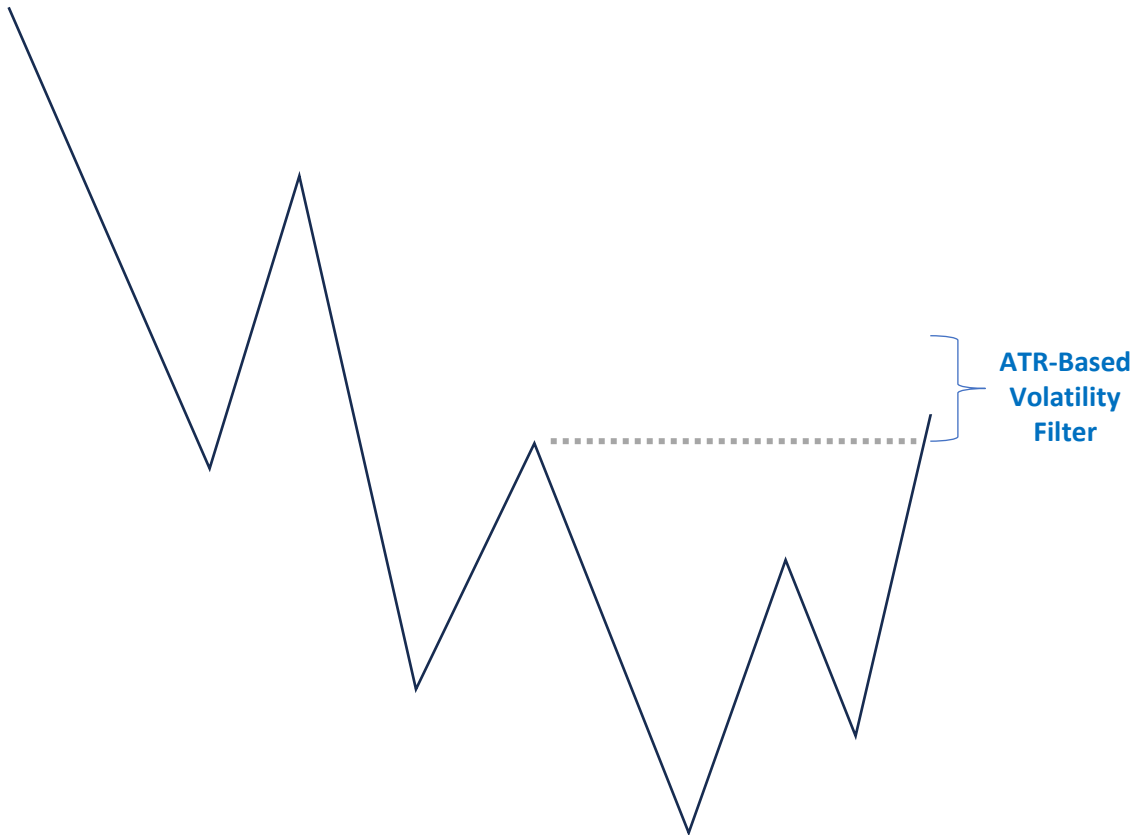
1. Grid trading mechanism: Placement of primary limit orders and hedge orders at calculated grid levels.
2. Stop loss positioning based on external swing points & ATR-based multiplier.
3. Partial take profit (PTP) execution and breakeven adjustments when profit targets are hit.

3.Trade Exit Scenarios:

1. Scenario 1: Take profit is reached & partial of the primary positions are closed
2. Scenario 2: A Change of Character (CHoC) in the opposite direction occurs, triggering trade closure.
3. Scenario 3: Price moves against the trade, hitting the hard stop loss, resulting in a full exit.

Illustration 1

- The lower timeframe (LTF) used in this example is the 15-minute (M15) chart.
- The valid swing high and swing low are identified using the market structure indicator.
- The higher timeframe (HTF) in this case is the daily (D1) chart, which we assume here is currently in a bullish trend (RSI > 50).

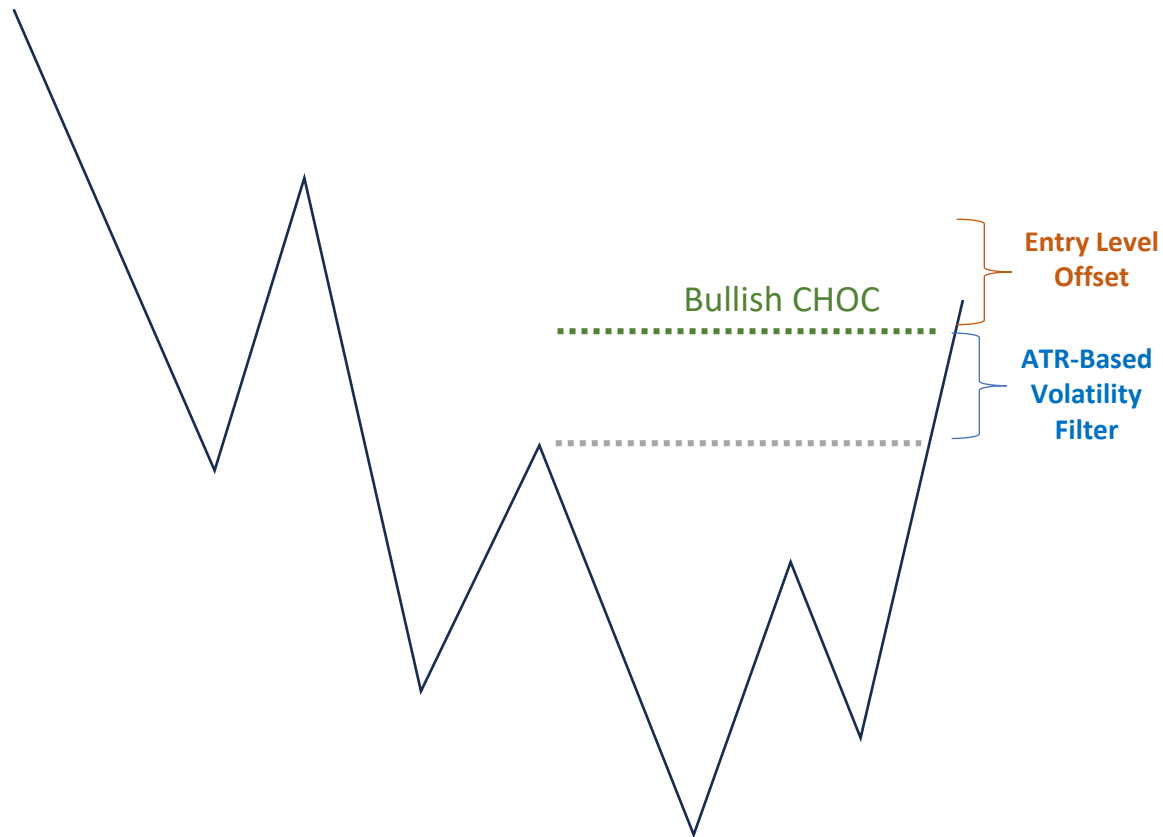


Grey line:

Price breaks above this level but we are not officially bullish CHOC yet as price has not yet broken through our ATR volatility filter (refer slide 11)

Illustration 2

- Since the HTF trend is bullish and a bullish CHoC has occurred on the entry timeframe, the entry trigger/condition is confirmed, and the trade setup is valid.
- We are now waiting for the price to reach the “entry level offset” before initiating the trade sequence (refer to slide 17)



Entry level offset:

While a bullish CHOC has occurred, we will not immediately initiate a trade but will wait for price to trend further up

Green line:

A bullish CHOC is confirmed when price has broken above the ATR volatility filter

Illustration 3

- Once the price reaches the entry level offset, the EA will initiate the first trade, which is a market buy order.
- Simultaneously, the EA will set up the trade sequence, which includes:
 - Pending buy limit orders (primary orders) placed at predefined grid levels.
 - Pending sell stop orders (hedge orders) placed at the same level as the pending primary orders
 - Stop loss (SL) for the entire trade sequence, ensuring controlled risk.
- These examples will be highlighted in the following slides

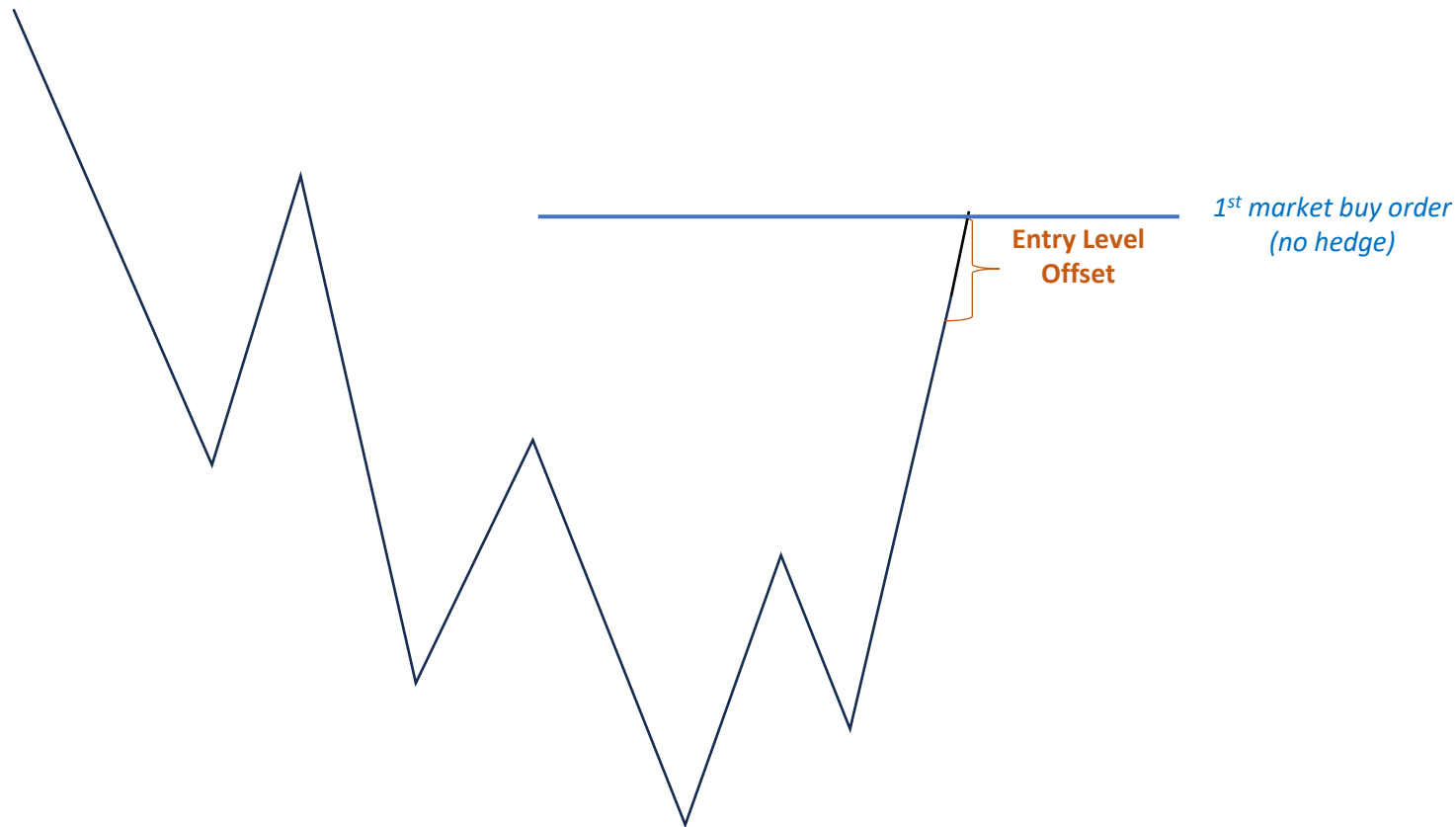
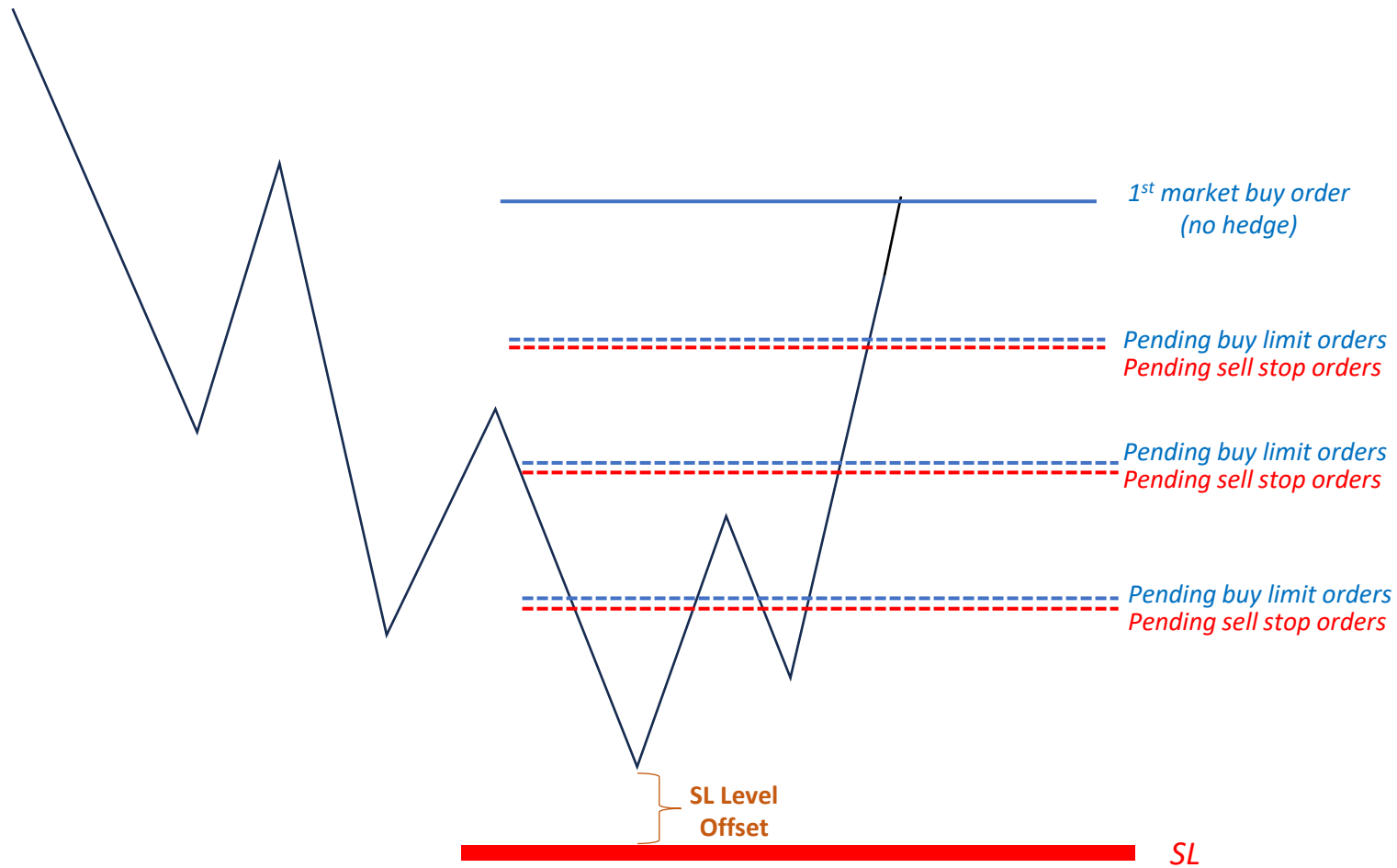


Illustration 4

- Pending buy limit orders (primary orders) lot size example = 0.1 lot at every level
- Pending sell stop orders (hedge orders) lot size example = 0.05 lot at every level (refer to slide 21)
- Stop loss (SL) for the entire trade sequence, with a SL level offset (refer to slide 17)



In the following slides, we will walk through how:

1. Pending orders are activated as the price moves.
2. Hedge orders are triggered to manage risk.
3. Primary orders and hedge orders are closed based on different price movements.
4. Take profit and stop loss mechanisms operate as price develops.

Illustration 5

- Assuming the price reverse & reaches the 2nd grid level, this triggers both the pending buy & pending sell order.
- At this point, we have 2 buy order & 1 sell order

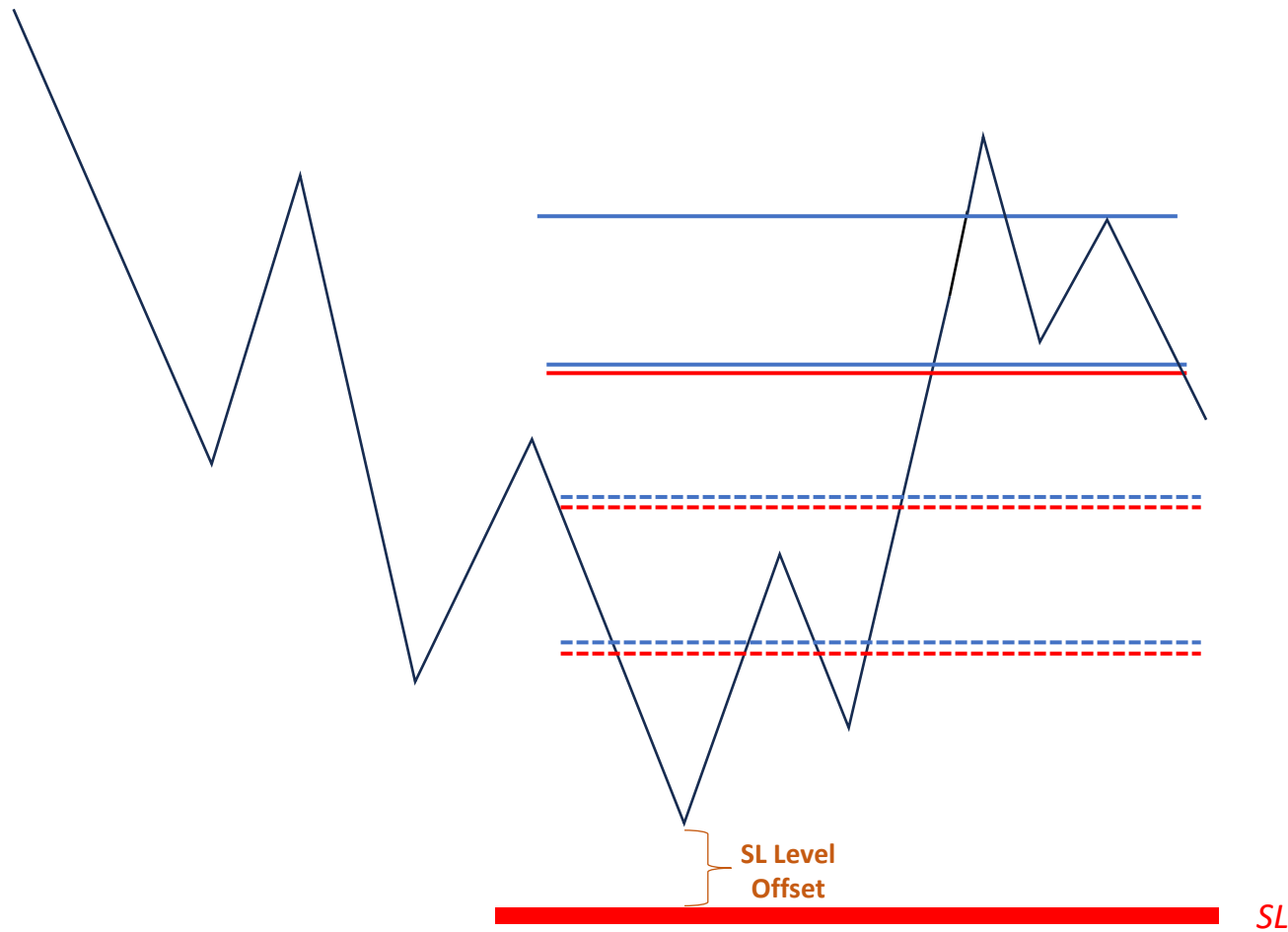


Illustration 6

- As the price continues to move downward, it triggers the next grid level, leading to the following trade actions:
 - Primary Buy Orders:
 - The pending buy limit order at this grid level is activated, adding to the existing buy positions.
 - At this point, there are now 3 active buy orders.
 - Hedge Orders:
 - The previous sell stop hedge order is closed for a profit since the price has moved in its favor.
 - A new sell stop hedge order is triggered, meaning there is now 1 active sell order.

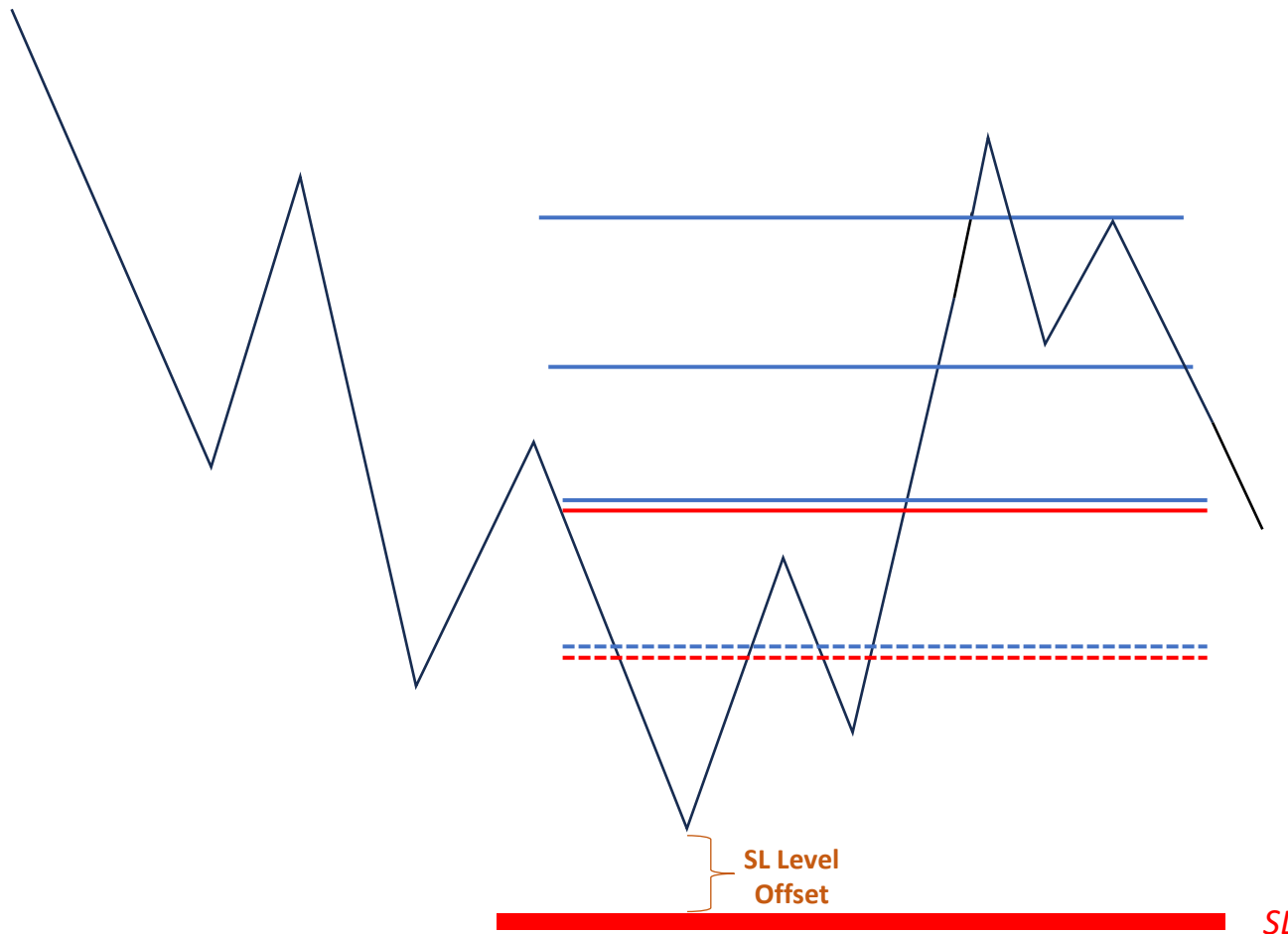
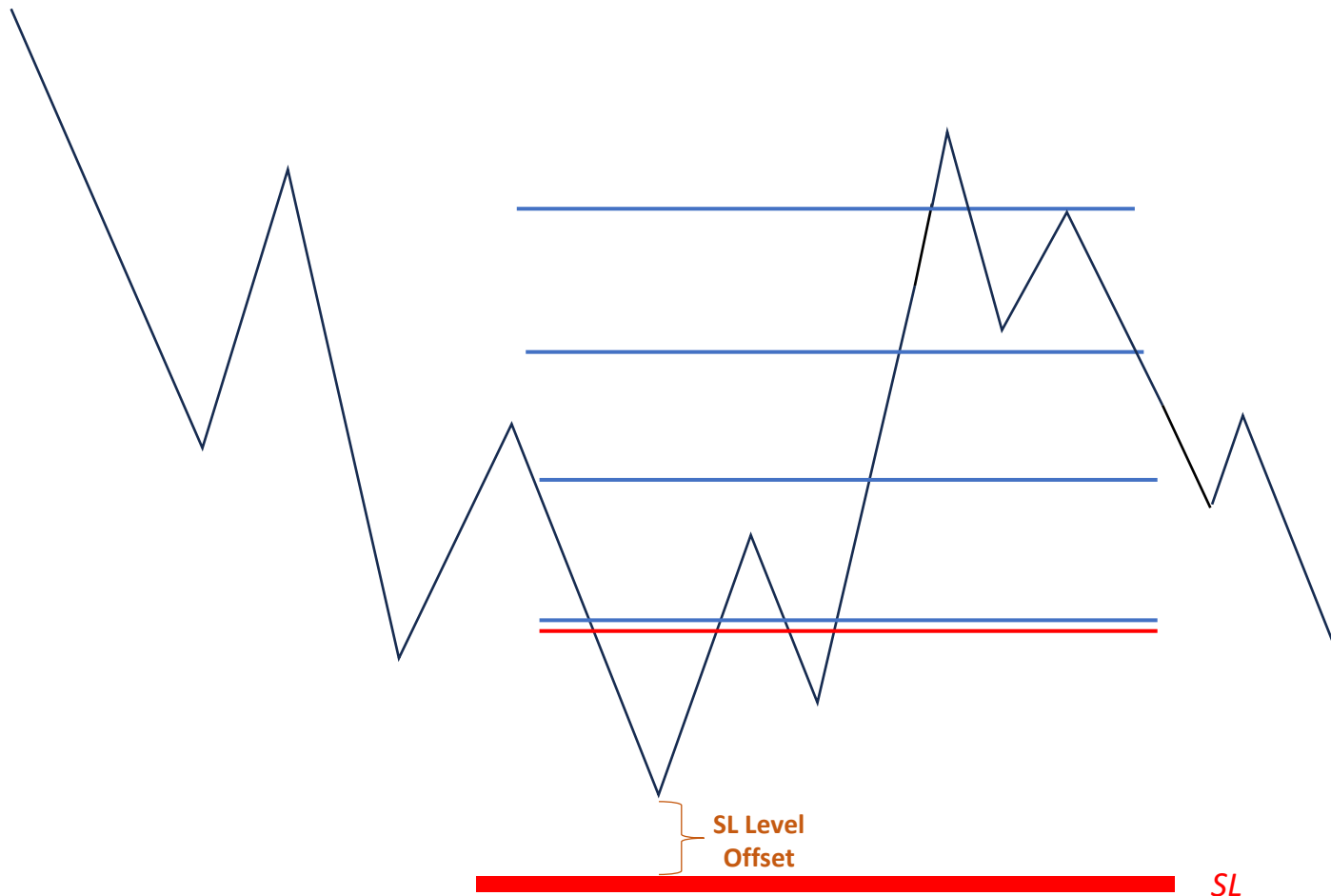


Illustration 7

- As the price continues to move downward, it triggers the next grid level, leading to the following trade actions:
 - Primary Buy Orders:
 - The pending buy limit order at this grid level is activated, adding to the existing buy positions.
 - At this point, there are now 4 active buy orders.
 - Hedge Orders:
 - The previous sell stop hedge order is closed for a profit since the price has moved in its favor.
 - A new sell stop hedge order is triggered, meaning there is now 1 active sell order.



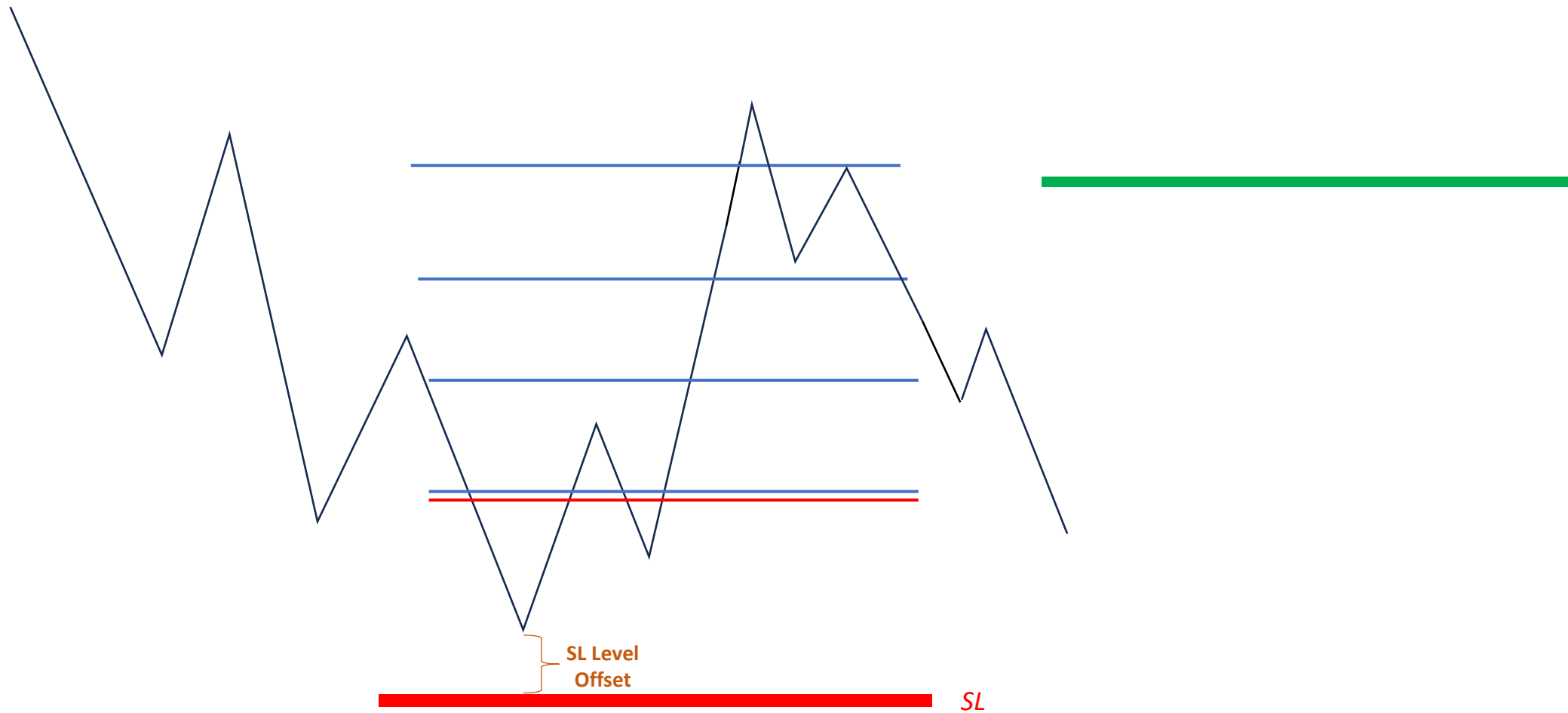
In the following slides, we will walk through how the trade sequence is closed out, depending on how the price moves.

Referring to Slide 19, primary trades are closed based on three scenarios:

- Scenario 1: Take Profit is Reached
 - A portion of the primary positions is closed when the predefined partial take profit target is met.
- Scenario 2: Change of Character (CHoC) in the Opposite Direction
 - If a CHoC occurs against the current trend, indicating a potential trend reversal, all open primary positions & any hedge positions are closed to exit the trade.
- Scenario 3: Stop Loss is Hit
 - If the price moves against the trade and reaches the hard stop loss, the entire trade sequence is fully exited to limit losses.

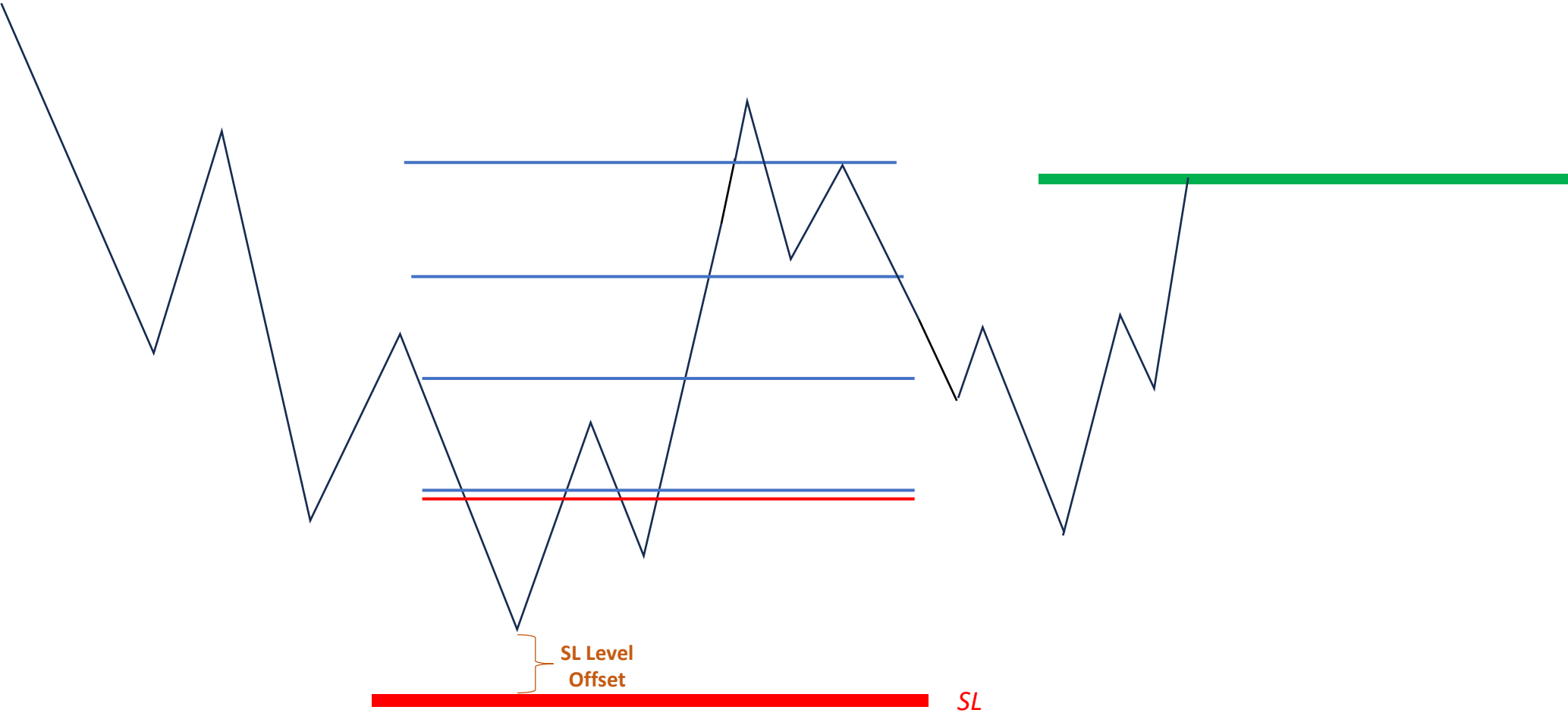
Scenario 1: Take Profit is Reached

- A portion of the primary positions is closed when the predefined partial take profit target is met.
- Here, we assume the profit target calculated by the EA is 'Green Line' & the no of partial positions to close is 2 positions. The number of positions to close when a partial take profit is met is based on user input.
- We will close those positions with the least profit / still in loss



Scenario 1: Take Profit is Reached

- When price reaches the profit target (green line), we will close 2 positions & because the 1st & 2nd positions is the least profit, the EA will close these two positions



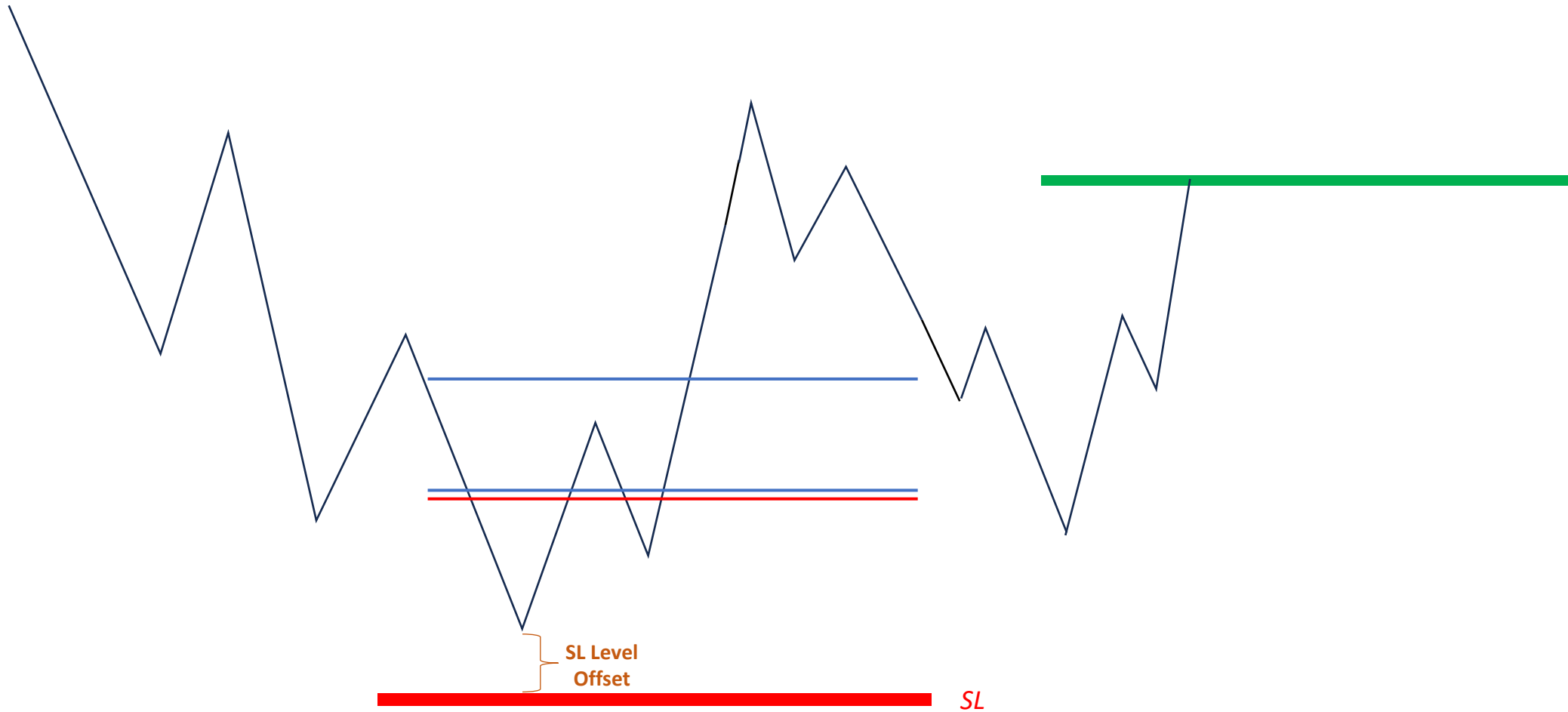
Scenario 1: Take Profit is Reached

After closing two positions, the trade sequence is now left with:

- Primary Orders: 2 active buy orders.
- Hedge Orders: 1 active sell order.

From this point, one of two possible scenarios will unfold:

- Scenario 2: Price Continues to Trend Up → CHoC Occurs → Full Exit for Profit
 - If the price continues moving upward and eventually forms a Change of Character (CHoC).
 - The remaining primary orders are closed in profit, and the hedge order is closed for a loss
- Scenario 3: Price Reverses → Primary Orders Closed for Loss, Hedge Order Closes for Profit
 - The primary buy orders hit their stop loss and are closed at a loss. The hedge order, is closed in profit



Dashboard:
TBC

END