MQL5 EA DEVELOPMENT PROJECT

Project Details	
Client:	Zippu // MQL5 Handle
Project Title:	Simple MACD Crossover Advisor
Project Lead:	TBD
Project Start Date:	TBD
Project End Date:	TBD
Agreed Upon Budget:	<100USD?

Trading idea

I would like to create a simple MACD crossover EA, to help me to learn the MT4 language more rapidly and effectively than on my own. There will be some variables to affect the performance and facilitate optimization of this strategy.

The strategy will be based on the MACD crossover as the primary trading signal. This trading signal will be filtered by trend on both the active and higher timeframe using different SMAs. There will never be more than one trade open at any given time.

Trade size will be calculated according to available account equity at the time the trade is opened, not overall balance. It will be calculated in steps of 5k available equity. This is to account for the possibility of other robots working on the same account, to minimize overlap.

As the required functionality is merely a combination of existing basic MT4 functions and switches, I do not expect that the completion of this educational EA will infringe on any personal or confidential coding structures used by developers.

If the developer has ideas regarding this strategy / EA that they want to share, I am happy to discuss.

The final deliverable will be the source code for the EA that I can open and manipulate in the MetaEditor to further my learning objectives. There will be no limitations imposed on my freedom to do what I want with this source code after delivery (do not include proprietary elements that cannot be shared).

Requirements of this final code:

1. The source code will compile without errors
2. The resulting EA will run as expected without errors

Terms & Definitions

The following terms are used in the description of this EA and are here defined for precision.

Active Bar

Unless otherwise stated, all actions will be performed either on the active bar, or on the previous bar. The active bar is defined as the live market bar (bar "0").

Previous Bar

Unless otherwise stated, all actions will be performed either on the active bar, or on the previous bar. The previous bar is defined as the first historical bar in a time frame (bar "-1"). The second oldest bar is defined by bar "-2", etc.

Current Timeframe

The timeframe that is currently selected on the active window containing the EA.

Higher Timeframe

The higher timeframe that is used for trend confirmation, typically 4-6 times "above" the current time frame (for example if current = M5, higher = M30).

Upwards MACD Crossover Trigger

When the MACD crosses from negative to positive, this is the signal to open a buy position. Subject to the trend filter. This means that the previous bar closed with a positive MACD, while the bar before it closed with a negative MACD. (Proposal: If bar(-1) > 0 & bar (-2) < 0)

Downwards MACD Crossover Trigger

When the MACD crosses from positive to negative, this is the signal to open a sell position. Subject to the trend filter. This means that the previous bar closed with a negative MACD, while the bar before it closed with a positive MACD. (Proposal: If bar(-1) > 0 & bar (-2) < 0)

Risk

Used to calculate the effective lot size, input as a %. When used in formulas however it should be counted as an integer. For example, a risk of 5% should be used as 5.0 and a Risk of 10% should be used as 10.0 in formulas such as the Effective Lot Size.

Effective Lot Size

Effective lot size will be = Integer((Equity / Lot Step Size)) x Risk x Baseline Lot Size. Where Integer refers to truncating a double into an integer. For example, if there is 13000 equity and the step size was 5000, then:

Equity / Lot Step Size = 13000 / 5000 = 2.6
Integer((Equity / Lot Step Size)) = int(13000 / 5000) = 2

Baseline Lot Size

This is the default starting lot size to be used for calculating the effective lot size, and is defined by the user.

The Baseline Lot size is not expected to be changed, given all of the other factors, but at least the option is available for testing purposes.

Magic Number

The specific number to separate EA orders from any other active orders is 151.

ATR Tuning

The default setting will be to use the ATR as the baseline factor for SL, TP and TS values. The ATR Tuning variable allows us to modify the actual value used. This will be used during optimization testing. For example, if the ATR is 100 and we have an ATR SL multiple of 0.95, we will instead use 95 pips as the SL value instead of 100. The ATR multiple can never be 0 or negative.

Stop Loss (SL)

If the "Use stop loss" switch is FALSE, SL = 0 (not used).

If the "Use ATR based stop loss" switch is TRUE, the SL value will be SL = (ATR) x (ATR SL Multiple). The SL value is set once when the order is sent, and is not updated every tick with a new ATR value.

If the "Use ATR based stop loss" switch is FALSE, the SL value will be defined by the "Stop loss pips" variable.

Take Profit (TP)

If the "Use take profit" switch is FALSE, TP = 0 (not used).

If the "Use ATR based take profit" switch is TRUE, the TP value will be TP = (ATR) x (ATR TP Multiple). The TP value is set once when the order is sent, and is not updated every tick with a new ATR value.

If the "Use ATR based take profit" switch is FALSE, the TP value will be defined by the "Take profit pips" variable.

Trailing Stop (TS)

If the "Use trailing stop" switch is FALSE, TS = 0 (not used).

If the "Use ATR based trailing stop" switch is TRUE, the TS value will be TS = (ATR) x (ATR TS Multiple). The TS value is set once when the order is sent, and is not updated every tick with a new ATR value.

If the "Use ATR based trailing stop" switch is FALSE, the TS value will be defined by the "Trailing stop pips" variable.

Validation Close

When both the open and close of the previous bar have crossed the 10 SMA line, this is a trigger to close the trade. This close condition is controlled by the switch “Validation Close”. When the switch is TRUE we use the conditions below. When the switch is FALSE we ignore them.

If “Validation Close” = TRUE

For a buy position

If the Previous Bar’s open and close are below the 10 SMA, close the open buy position

For a sell position

If the Previous Bar’s open and close are above the 10 SMA, close the open sell position.

Variables

Proposed default values in parenthesis.

- Switches
  - Use take profit? TRUE/(FALSE)
  - ATR based take profit? (TRUE)/FALSE
  - Use stop loss? (TRUE)/FALSE
  - ATR based stop loss? (TRUE)/FALSE
  - Use trailing stop? (TRUE)/FALSE
  - ATR based trailing stop? (TRUE)/FALSE
  - Validation Close? TRUE/(FALSE)
- ATR Tuning
  - ATR TP Multiple (2.0)
  - ATR SL Multiple (1.0)
  - ATR TS Multiple (1.0)
- Money management
  - Baseline lot size (0.01)
  - Lot step size (5000)
  - Risk percent (10%)
  - Take profit pips (100)
  - Trailing stop pips (50)
  - Stop loss pips (25)
- MACD
  - Fast period (12)
  - Slow period (26)
  - Signal period (9)
- General
  - Higher time frame (M30)
  - Magic Number (151)
- Filters
  - Higher time frame long SMA (200)
  - Higher time frame short SMA (10)
  - Current time frame long SMA (200)
  - Current time frame short SMA (10)

While these are the variables that I propose, there are certainly others that could be included. If the developer has ideas that they think would facilitate the objective, then I am happy to discuss those suggestions.

Trading Signals

In this strategy we use a higher timeframe to determine the overall trend that we wish to follow. When price is above the higher time frame 200 SMA we only look for buys, and when it is below the 200 SMA we only look for sells.

With the exception of SL, TP, TS, checks for opening and closing of positions are done on the opening of a new bar.

Opening a Buy Position (check bar (-1))

- Price above higher time frame 200 SMA = TRUE
- MACD higher time frame positive = TRUE
- Price above current time frame 200 SMA = TRUE
- Upwards MACD Crossover Trigger = TRUE (current time frame)
- Open at start of bar

Opening a Sell Position (check bar (-1))

- Price below higher time frame 200 SMA = TRUE
- MACD higher time frame negative = TRUE
- Price below current time frame 200 SMA = TRUE
- Downwards MACD Crossover Trigger = TRUE (current time frame)
- Open at start of bar

Closing a Buy Position (check bar (-1))

- "Validation Close" = TRUE
- Previous Bar's open and close < 10 SMA = TRUE
- Close open buy position

Closing a Sell Position (check bar (-1))

- "Validation Close" = TRUE
- Previous Bar's open and close > 10 SMA = TRUE
- Close open sell position

Global Closing Conditions

- If the TP is triggered
- If the SL is triggered
- If the TS is triggered

Screenshots and flow charts

The following diagram (Figure 1) shows a very standard MACD cycle with several Upwards & Downwards MACD crossover signals.

Independent of the trend filters, the blue arrow indicates that the trend has crossed upwards, and the green arrow indicates that the trend has crossed downwards. The bar highlighted by the arrows is always the second after the crossover, since we need to confirm that the crossover has first happened.

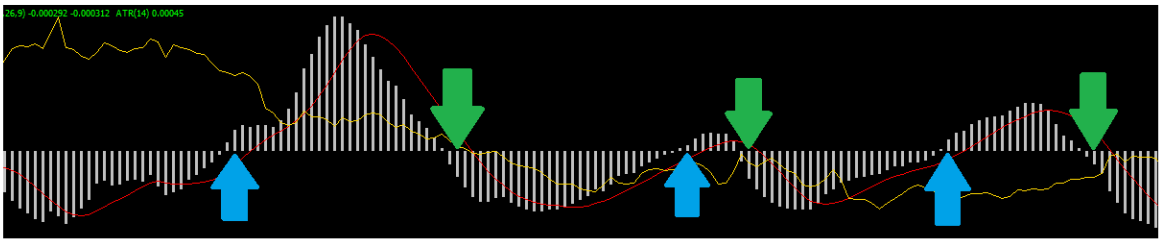

Figure 1 – MACD trend crossovers

The following diagram (Figure 2) shows an upward trend closing below the 10 SMA. For an open buy position, this will be considered as a closing signal as the open and close are below the 10 SMA.

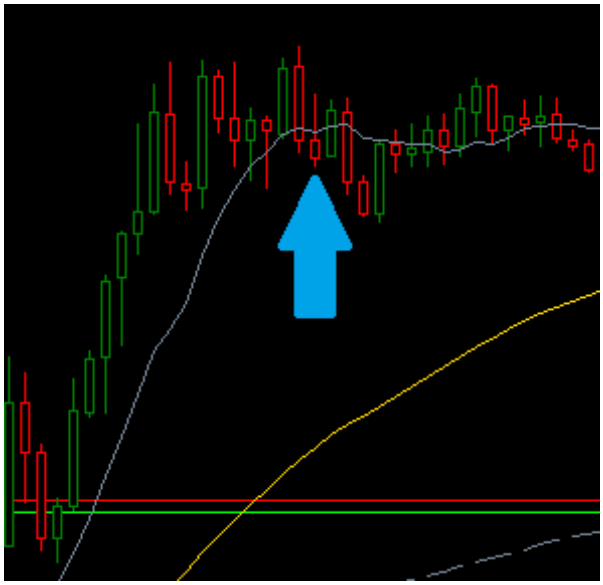

Figure 2 - Previous bar closed below the 10 SMA, close an open buy position.

The following diagram (Figure 3) shows a downward trend closing above the 10 SMA. For an open sell position, this will be considered as a closing signal as the open and close are above the 10 SMA.

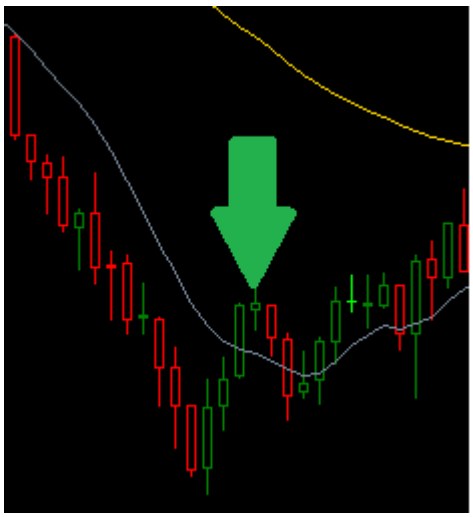

Figure 3 - Previous bar closed above the 10 SMA, close an open sell position.

The lifetime of signals/orders/positions

Orders are opened and closed according to the signals and indicators discussed above. There should never be a trigger to open a new position if one is already opened. There should only ever be one open at a time.

Management of open positions and pending orders

Orders are opened and closed according to the rules outlined here.

This EA creates no pending orders (no buy / sell stops or limits).

Orders will be regularly modified according to the Trailing Stop condition.