Goal

The investment program I run uses Bitcoin futures as the investment vehicle, allowing me to take long and short directional bets on the expected trajectory of Bitcoin futures prices, looking to (on average) sell out of long trades above entry price, and close out short positions below entry price.

The overarching goal is to deliver strong, consistent risk-adjusted returns, net of costs. This can be measured using the Sharpe ratio as follows:

Sharpe Ratio = (Rx – Rf) / StdDev Rx

Where:

Rx = Expected portfolio return (net of costs)

Rf = Risk-free rate of return

StdDev Rx = Standard deviation of portfolio return (or, volatility)

In the real world, I set the risk-free rate to 0, so simply compute annualized returns / annualized risk (risk/return ratio.) Ideally, we are looking for the AI to deliver a risk/return ratio of >3 out of sample.

Process

Overview

My process evaluates candidate chart/symbol/indicator combinations looking to optimize for recent co-movement behavior between market cycles up and down synchronizing with the up and down moves of the respective indicators under evaluation. I call this synchrony.

My expectation is, that when you find a pairing of an indicator who’s directional movement lines up well with the directional movement of the market [expressed as a chart size (in minutes) paired with an indicator (in my models, I used momentum oscillators)] the indicator will continue to “read” the market direction looking forward and you can trade market direction based on the expectation of a continuation of that relationship.

In practice, it is as follows:

1. Screen for chart/indicator pairing candidates.

I open my Master\_Screener spreadsheet, which has RTD links into CQG, which draws into the sheet evaluation metrics that I believe are relevant to assessing candidate quality. In total, it brings in data for 227 charts ranging from 10 minutes (10m) to 690 minutes (690m.)

It brings data in for two different indicators (the KCD and the KPO) for this range of charts.

The metrics used in evaluation include:

* + Profit to Loss Ratio (PLR): for a specified period of time, $ value of winning trades / $ value of losing trades.
  + Profit to Max Draw (PMD): for a specified period of time, largest difference between peak Total net profit since start of period / largest subsequent drawdown
  + Total Net Profit (TNP): $ sum of all trades since start of period
  + Gain/Loss Ratio (GALO): $ value of all winning bars / $ value of all losing bars over specified period. (A winning bar is a bar that moves up when you are long or down when you are short, and the opposite for losing bars.) Similar to PLR but calculated by bar aggregations instead of trade aggregations.
  + Current Drawdown (Current Draw): $ value of difference between highest TNP since start of period and current TNP.

The periods over which the sheet calculates these metrics are as follows:

* 1-15 days in 1-day increments
* 23 days
* 60/90/130 bars

The first stage of the process involves me running pre-screens for candidates using two methodologies for each of the two indicators. These shortlisted candidates are stored for step 2.

Step 2 involves a richer set of data being calculated for the superset of candidates for comparison. Candidates are evaluated across the series, looking for:

* High PLR
* High PMD
* High TNP
* Low current drawdown
* Consistency over multiple day-based periodicities, especially the most recent observations (1-3 days back) and, depending on the chart size, up to 10-15 days back (for longer charts.)
* Consistency over 60/90/130 bar lookbacks.

1. Final Selection

I check each likely candidate on a chart looking for consistent ability to “call” price peaks/ reversals demonstrated over an adequate length of recent history. In cases where there is an obvious regime shift (from large range cycling behavior to low range choppy sideways price behavior), I will evaluate final selections based on the current regime, and therefore only the periods of time since the commencement of the current regime, as prior regime is generally less relevant.

I am also checking for strong metrics but where the more recent bars show a slowing of that relationship.

I am also looking to eliminate charts where they have strong metrics, but which driven by one or two large winning trades, but where other periods outside of the large winning trades are dissimilar in terms of cycle frequency and amplitude.

I am also looking, ideally, for sine waving KCD behavior (my preference is to have KCD turn down >0, and turn up <0 sequentially), as well as bars between turns on KCD and KPO showing recent consistency, and the value of KCD /KPO points between turns showing some degree of consistency.

Ultimately, I can select anything from 0-10 chart/indicator pairings, but most often 1-5 pairs.

1. Deployment

Finaly, with charts and indicators chosen, I input these into a different set of spreadsheets (depending on what exchange I am trading on) and ready them for automated trading.

For the initial trades to be entered, I will either wait for the next trade (if the current one is either close to a turn or looks like entering now would be a very late entry and you expose yourself to the risk of the market reversing against you) or look to enter at a slightly better price that the current market price. I use synchrony on shorter term charts (1-60 minutes/1-300 seconds/<150 tick charts) to find synchrony candidates that can help me understand very localized price movement to finesse entries/exits.

I also use my judgement on trend to decide whether placing out only long/only short/two sided trades is best given the strength of each side of the market (going short against a strong uptrend is obviously dangerous unless there is both resistance levels and price action reacting strongly to those levels meaning a short may make sense, but only with tight stops/risk control.)

Sizing each trade is also performed here, with the portfolio split across many candidates or concentrated in one.

1. Monitoring

Ideally, during the trading process, I am monitoring for the continuation of the synchrony relationship, examining price action at the quicker end of the spectrum (5 minute charts) and seeing how price is reactive to VWAP, prior highs/lows, value are highs/lows and VPOC (volume point of control) over different periods (current day, prior day, 5 day, 23 day).

I also look at 7, 25 and 99 period moving averages on the 1-5 minute charts to see how cleanly trending moves are being supported in the trade’s direction.

I also check the MFE (most favorable excursion) for the chart/indicator pairings showing the levels at which trades have historically had their ”in-the-money” peak, and where a higher number of trades have reach an attractive MFE, albeit not a peak.

Equally, I look at MUE (most unfavorable excursion) to see how far out of the money trades have typically veered during the evaluation window to know where the price action will be outside of the observed extremes to the downside, helping inform for stop locations.

I also look for how far the KCD/KPO has “travelled” since the last turn and compare against the evaluation period to identify peaks in KCD/KPO travel (KC\_howfar/KP\_howfar metrics) that may indicate that a trade is close to its end.

I also look at the number of bars since a trade entered and compare against the evaluation period to identify timing of when trades have typically come to an end.

I also use these above levels for an evaluation of the overall structure of the market to help me decide where to lock in protect profits, and where to identify levels above/below which I want to exit the trade at a loss. Clusters of levels clearly have stronger cases for location of profit locks and stops.

1. Other factors

In order to manage risk, understanding where you are in the week (what day, what time) can be helpful (e.g. Friday afternoons can be slow, weekend gaps can create distortions in my metrics, US/European cash equity open hours are higher volume/larger move periods, etc..)

Also, knowing whether (for example) an FOMC statement/meeting minutes is coming can also cause one to want to close out/protect positions in anticipation of sharp volatility changes.

Finally, at any time an unforecastable news item can come out and instantly change market volatility and direction, so being aware of this risk and being ready to react accordingly is prudent.

1. Rescoring

Alongside the monitoring and the existing candidates and their respective trades, I also continually run the following reports to help reaffirm the existing selection, and/or identify whether new more optimal candidates are surfacing which may be worthy of changing my candidate pool.

Master/Screener: Time based bars 10-690 minutes

MBT\_machine: Time based bars 1-100 minutes

Range bars 10-150 ticks

Sub-minute bars (5-300 seconds)

For the much shorter duration bars, I may overlay tactical trades with these shorter horizons on top of the longer term, strategic positions from master screener.

If I do change the candidate line-up, I am back to step 2, and so the process continues.