Introduction

Crypto futures, specifically perpetual swaps (henceforth "perps"), are the most popular trading instruments in crypto. Unlike quarterly futures which have pesky features like a 'basis' and 'rollover' (how unpalatable), perps have a funding rate in lieu of a basis, and they do not expire. In essence, perps are designed to mimic the relative ease and familiarity of spot trading, just with a big dollop of leverage. Perps have some unique features such as funding rates, open interest, liquidations, and others which do not apply to regular spot markets. Given that most punters trade perps, it is worth becoming familiar with the specific features that apply to these contracts. This article is a summary of several long form tweets I made on open interest, liquidations, funding rates, and cumulative volume delta. I hope this becomes the go-to resource for traders wishing to gain at least a basic understanding of the main tools and indicators associated with perp trading. It's quite text-heavy, but I think that's more useful than less text and more cherry-picked examples.

Let's get on with it.

Open Interest and Liquidations

Open Interest

Open interest (OI) refers to the sum total of all open positions in a contract. Important: For every buyer there is a seller/for every seller there is a buyer, so OI is always comprised of 50% longs and 50% shorts. OI increases/decreases based on net open positioning. When you see price up + OI up you might infer that "there are more longs than shorts", but technically the ratio is always 50/50 (a buyer for every seller/vice versa). The more appropriate inference is that buyers are more aggressive than sellers and market participants are increasing their net positioning — and even that comes with caveats and nuances. When OI increases, we can infer that on net balance, market participants are increasing their positioning. When OI decreases, we can infer that on net balance, market participants are decreasing their net positioning. From a trading perspective, it's usually best to view OI in the context of some of the other tools we'll discuss in order to have a better idea of what type of participation is responsible for the OI increase/decrease.

Some general, back of napkin places to look for ideas:

1. Large OI increases through a breakout level
2. Large OI increases X days/weeks ahead of [news/event]
3. Large OI increases into key S/R
4. Large OI decreases on dumps into support/pumps into resistance
5. Divergences: Large increases in OI after impulsive price move without any follow through in price
6. Daily outlier increases/decreases in OI (more for trading watchlists)

Liquidations

Liquidations occur when the trading venue forcibly closes your position when you fall below the required maintenance margin for your position(s). With the preceding OI context, we can infer that liquidations typically — but not always — reduce OI as closing trades decreases net positioning in a contract. There are obvious exceptions to this, in particular instances where a lot of OI is added on a breakout/breakdown

which pushes the other side of the market offside — e.g. OI increase in breakout candle + additional OI increase from breakout traders chasing > OI decrease from shorts getting liquidated. Liquidations are typically mean-reverting, but they can also be trend-forming.Liquidations are messy, especially if they happen en masse or in a cascading fashion. Specifically, they form dislocations in the market by creating a flurry of market orders (and/or aggressive top of book limit orders) around the same price, and by extension, around the same time. This one-sided demand for liquidity will push price however high/low it needs to go through the order book until those orders are filled — priority is in execution, not pricing.This creates inefficiencies — the liquidated participants didn't voluntarily buy/sell at those prices, but they have no choice — the orders are executed at whatever prices can fill them, even if it means 'skipping' large chunks of the book. As a result, savvier traders sensing this can voluntarily provide liquidity at prices where they wouldn't ordinarily get filled, simply because their counterparties don't have the luxury of choice. This results in good prices for those providing the liquidity to forced traders, and bad prices for the forced traders (they don't have a say in the matter per se). In essence, this is where the milquetoast version of 'scalping liqs' comes from as a setup: liquidations = forced traders, forced traders = price insensitive/trade at bad prices, bad prices for them = good prices for you as their counterparty. It is worth noting that liquidations can, however, be trend-forming. Same logic, but without the mean-reverting properties. For example, in a rangebound market you'll have participants running [assortment of mean-reverting/buy high, sell low meme strategies] operating on the assumption that the market will remain within some general boundaries. As the market starts to break out, those sellers will quite frequently have overlapping invalidations (via stop market orders or instructions to rebalance more broadly). If the break is fast and forceful enough, those mean-reverting systems generate 'GTFO' signals around the same price and time. Shorts that close aggressively become (market/top of book limit) orders to buy + breakout traders piling in = significant price dislocation. In crypto you also get some weird nuances where post-breakout stubborn sellers will step in and get run over continuously/post-breakdown stubborn buyers will step in and get run over continuously, but perhaps that's a post for another day.

From a trading perspective, combining OI + liquidations can highlight inefficiencies and areas of present or future dislocation:

1. Large OI decreases + long liquidations on dumps into support
2. Large OI decreases + short liquidations on rallies into resistance
3. Large OI increases + short liquidations on breakouts
4. Large OI increases + long liquidations on breakdowns

There are also nuanced cases of 'stubborn OI' where chunks of freshly-added OI (presumed to be more directional than not) are offsides and are insensitive to that in the short-term but end up puking at the same time once the first chunk of OI is lifted — kind of like a game of chicken. Like most indicators, OI and/or liquidations become especially pertinent when there is a divergence formed between the 'aggressors' and what price is doing. For example, in the fourth example, we can generally infer that early longs have been crushed and sellers are being aggressive (especially if this is supported by funding rates, which we'll discuss). If the price of the asset does not

budge lower despite a lot of aggressive downside positioning, we can start to build a case for a reversal based on those heavy-handed sellers being absorbed. Looking for additional evidence, especially with regard to diverging price action, is very important. Take the third setup, for example. Taken at face value, you might think that a large OI increase on a breakout with long liquidations is bearish. But if the market continues to move higher and that added OI is "safe", then it's more likely to be a supported/trend-forming breakout. Conversely, the same combination but with price stalling around the breakout level would suggest that the added OI is "unsafe/vulnerable" and may result in a failed breakout. Same indicators, but the market's reaction (specifically the presence or lack of a price-based divergence) is the key differentiating factor.

Funding Rates

The funding rate is the cost of holding an open position in a perp. It is usually calculated by the difference between the [price of the perpetual swap contract] and [price of a spot-based index]. If funding is positive, the perp price is trading at a premium (above) the index price. Open long positions pay funding, open short positions receive funding. If funding is negative, the perp price is trading at a discount (below) the index price. Open short positions pay funding, open long positions receive funding. Perps are different to standard futures contracts because there is no expiry or rollover mechanism. This begs the question: how and why do perps generally trade in line with spot markets?

Answer: Funding.

This is a built-in arbitrage mechanism designed to incentivise traders to keep these instruments (specifically their prices) in line with one another. For example: Perp trading meaningfully above the spot index price → funding rate goes up. Two things happen:

1. It becomes more expensive for long holders to keep their positions open (negative incentive).
2. 2. Traders can buy spot, sell the perp, and collect the funding rate with minimal directional exposure (positive incentive).

The bigger the difference between the perp price and the spot price, the higher the funding rate. Think of this as providing greater incentives to arb the difference the more out of line these instruments get from each other. To be crystal clear, funding is primarily a product of the difference between [perp price] and [spot-based index price]. I'll also reiterate an important point from an earlier tweet: if funding is at baseline and/or there is no interesting divergence forming between price, funding, and time — you are unlikely to find an attractive setup. All of these tools become complementary and contextually interesting when "something doesn't add up" or if they're at/near a relative extreme.

From a trading perspective, identifying divergences between funding and price can lead you closer to productive trade ideas:

1. High positive funding but price is moving lower or stalling/not moving higher. Reasonable inference: Perp longs are aggressive but are not being rewarded for it. This is potentially bearish (especially if other contextual clues present e.g. price into key resistance).

2. High negative funding but price is moving higher or stalling/not moving lower. Reasonable inference: Perp shorts are aggressive but are not being rewarded for it. This is potentially bullish (especially if other contextual clues present e.g. price into key support).

3. Funding becoming more positive as price is moving lower. Reasonable inference: Perp dip buyers are in 'disbelief' fading the move AND/OR spot traders are the aggressive sellers. This is potentially bearish (especially if other contextual clues present e.g. perp OI increasing, spot volumes and CVD leading, et cetera).

4. Funding becoming more negative as price is moving higher. Reasonable inference: Perp sellers are in 'disbelief' fading the move AND/OR spot traders are the aggressive buyers (especially if other contextual clues present e.g. perp OI increasing, spot volumes and CVD leading, et cetera).

In essence, we're circling back to very important first principles here:

1. Who (if anyone) is being aggressive?
2. Is their aggression being rewarded?

As a final note, it's also important to understand not only what the funding rates are and their implications, but also how they came to be. I can think of three particular examples where funding rates are misinterpreted most frequently.

1. Negative funding after an outsized move with liquidations. As discussed, funding reflects the difference between the perp price and the index price. Perps have higher leverage than the spot-based assets that typically make up the index. As a result, when there's a large amount of liquidations in the perp, those liquidations and messy unwinds exacerbate the size of the move. Perps typically become more dislocated than spot at extremes, so naturally they end up trading at a discount to the index. Accordingly, the negative funding after a wipeout does not necessarily mean that the market is short from the bottom now. It's just a reflection of perps getting hammered harder than spot because of the leverage that they offer.

2. "Spot premium". Spot premium — where spot price of an asset is trading consistently higher than the perp or future price of an asset — can provide useful signals. For example, during the 2021 bull run it was common to see spot exchanges like Coinbase consistently trading at a premium to perps and futures during the U.S. session. One could reasonably see this as a reflection of risk appetite and more aggressive buyers in the spot market, which is generally a good sign. However, this same argument was made many times on the way down from circa ~50k BTC — and it didn't quite work out. Mechanistically, spot was leading the selling → perps would follow → perps get liquidated and move more aggressively than spot → perps end up below spot → "spot premium". It's the same spot premium in form but completely different in substance and context. If you will be relying on spot premium as an argument for spot demand, make sure that you have other arguments for there being demand in the market (not just the funding rate or basis).

3. Dodgy outlier altcoin (max) funding = squeeze imminent. Particularly pertinent pattern in the second half of 2023. It goes something like: huge price increase → hugely negative funding → speculators pile in the long side for continuation/short squeeze on account of the

negative funding rate → spot gets mega dumped instead and funding normalises. For the outlier lower caps specifically, I'd be sceptical about looking into funding-oriented stuff too closely as it tends to be 'gamed' more often than not. The signals tend to be clearer on more liquid, higher cap assets. More broadly, funding alone does not always make for a compelling argument for a squeeze. You need to first build a prima facie credible case that the aggressors are the ones offside, ideally with some confluence via OI. Even then, positive funding can normalise by perps closing/spot buying and negative funding can normalise by perps buying/spot selling — without any dramatic squeeze.

In summary, funding rates are a useful tool for gauging aggressive positioning, its origins (perps vs spot), and making probabilistic arguments for reversal/continuation based on the market's response to that aggression. Incorporating funding rates into the previous section on open interest and liquidations is also helpful. Instead of inferring an increase/decrease in aggressive positioning based solely on the funding rate, we can (somewhat) quantify the magnitude of the aggressive positioning by observing corresponding increases/decreases in open interest. While I don't personally fully agree with blanket observations such as price down + OI up + funding down + CVD down = shorts aggressive or price up + OI up + funding up + CVD up = longs aggressive, combining these tools can give you a slightly more nuanced view of the market than viewing them in isolation.

CVD (Cumulative Volume Delta)

CVD is essentially a visualisation of market buys minus market sells. Unlike the previous sections on funding rates and open interest, CVD is slightly more niche. CVD is typically used to infer aggressive participation i.e. traders executing via market orders/crossing the spread. These traders take liquidity and typically trade with passive traders i.e. limit orders resting in the order book. As with most indicators, CVD is most interesting and relevant when some sort of divergence is visible.

In my view, the two most notable forms of divergence are the following:

1. CVD diverging from price. These are standard oscillator-style divergences e.g. CVD makes a higher high while price makes a lower high / CVD makes a lower low while price makes a higher low. This is evidence of absorption i.e. aggressive orders being 'absorbed' by passive orders (colloquially, trying harder and having a diminishing impact on price). The divergences described above are typically more impactful than the other way around e.g. CVD makes a lower high / price makes a higher high. In general, for reversal setups and intraday trading, you want setups where the more aggressive participants are not being rewarded.

2. Spot/Perp CVD divergence. On average, with many exceptions (mostly discussed in the funding rates post), perp markets provides a better proxy for aggressive traders than spot markets. Perps — by virtue of the high leverage available — attract a lot of casual punters who simply want to ape some positions. While it's not entirely accurate to posit that perps = dumb / spot = smart, it's worth being aware that perps attract more aggressive positioning and sloppy execution on average. With that in mind, it can be useful to overlay perp CVD with spot CVD to see which side is being aggressive, and importantly, to what effect. Common examples of reversal setups include an aggressive ramp up in perp CVD into a key level with no spot follow through or even spot selling / aggressive ramp down in perp CVD into a key level with no spot follow through or even spot buying.

One can also identify more nuanced examples e.g. spot and perp CVD generally aligned, price reaches key support and perp CVD becomes more aggressive and makes a lower low while spot CVD makes a higher low / price reaches key resistance and perp buying becomes more aggressive and makes a higher high while spot CVD makes a lower high. In other words, it can be useful to observe which side 'takes over', and to what effect, at inflection points. On average, for reversal trades, perps getting disproportionately aroused at key levels (relative to their price impact and/or relative to spot markets) can add confluence to reversal setups. CVD does not always show the full picture. When the market is filled with tourists punting leverage on altcoins, CVD can be a reasonably accurate proxy for measuring aggression (whatever that means). However, when dealing with bigger markets e.g. BTC/ETH with more sophisticated participants and methods of order execution, the picture can get muddied very quickly. For example, one method of execution is 'limit taking'. This sounds paradoxical as limit orders typically add liquidity, not reduce it. However, this method involves pushing the price up with rapidly repricing and refreshing limit buys (often but not always via spot books). It's completely conceivable that this results in a 'divergent' CVD i.e. spot CVD not moving up (or even moving down) despite bullish activity in the spot orderbooks. This kind of activity can be imperfectly tracked by looking at bid/ask ratios or depth, but you can already tell that treating CVD as an omniscient oracle may give an incomplete view of the market. There are also examples of market participants being short-term aggressive in perps with the sole intention of filling spot limit orders in the opposite direction e.g. burst of perp buying to fill (typically larger) spot sell orders, which aren't always fully visible either. Overall, CVD is cool, but requires the appropriate context and confluence. Standout divergences, especially in more tourist-dense altcoin markets, can provide useful short-term to medium-term trading signals. This can be especially potent if used as a confluence factor when building a case based on good levels and if funding/open interest support your argument. Blindly following CVD as bullish/bearish, without nuance and on higher market cap assets probably isn't the best idea.