

Trading the ETH Merge

A Song of Calendar Spreads and Forward Pricing



Summary

- 1) ETH Merge is coming. Futures pricing does not indicate expectations for the future but arbitrage via funding costs. High staking yields pushes curves into backwardation
- 2) We provide a fair value model for pricing forward ETH prices
- 3) Dec-Mar calendar is priced “wrong” at +13; this indicates ETH Mar23 futures are not pricing PoS
- 4) Additional opportunities are available, especially to bet on a delay of Merge to Q4

Background

The Ethereum blockchain is converting from Proof of Work (PoW) to Proof of Stake (PoS). This has been a long time coming and is now expected to occur sometime between Sep 15 and Sep 19. This note does not concern itself with whether PoS is a good idea or not. The purpose is to think about the pricing of relevant

markets and whether there may be opportunities. We believe that there are.

The key points for the trader here are: 1) the ETH mining community stands to lose their source of income, 2) PoS unlike PoW provides a staking yield for ETH, 3) the news flow indicates that this is going to happen¹.

Summary of Forward Pricing

For the full breakdown of forward pricing and assumptions, see Appendix B below. For quick reference, here are the results:

ETH Price: 1900			
Forward Date	Fair Value Basis	Market Price	Implied ETHW
9/30/2022	2.8	-22	24.81
12/30/2022	-13.8	-24	10.23
3/31/2023	-30.3	-11	-19.35
6/30/2023	-46.9	-3	-43.93

Assumptions in the above are: Aug 13 trade date, ETH @ 1900, baseline/funding rate of 2.5% (in line with BTC basis to Dec quarterly at FTX/Binance), 9/19 merge date.

Opportunities

We see four main opportunities in the market right now:

- 1) **Buy Sep basis -22:** Sell option on ETH PoW fork now at ~\$24 via selling ETH spot and buying Sep futures.
- 2) **Sell Sep basis -22 / Sell ETHW futures \$72:** Buy option on ETH PoW fork now at \$24 and sell Poloniex future at \$72. Arbitrage is a bit strong for this trade but it is at least good relative value if one has access to Poloniex

¹ Appendix A is included with additional information on timing and news flow plus how at least one

exchange is handling the Merge in its futures contracts

- 3) **Sell Sep-Dec Calendar at -2:** Bet on a delay of the merge by trading the Sep-Dec calendar spread
- 4) **Sell Dec-Mar calendar spread at +11:** +11 is in line with PoW calendar spreads and out of line with PoS calendar spread pricing.

Further details follow.

An ensemble position of combining the above makes the most sense to us as traders. Combining 1 & 4 in a ratio is particularly attractive to us. Something like doing 8-10X of the Dec-Mar vs 1X of the long Sep basis. Note that one can also look at the Poloniex futures instead, however, if the Merge does not occur, I'm not sure what happens to the ETHW/USDT "contract". The calendar spread might be the purer play and have more liquidity.

We looked at stETH-ETH. Current pricing is about 2.5-3% discount. There are a lot of factors that go into that pricing that makes it difficult to disentangle. Our belief is that the contract should be trading at a discount generally as a concession for obtaining liquidity. 2.5% of 1900 is \$48. This is not an obvious entry point for us and we have left it out of our "menu" of trade ideas.

Buy Sep Basis -22

This is straightforward. With a model calendar spread price of ~3, this price puts the implied ETHW at 24-25.

From a pure value proposition, there is an argument to be made that there is not a particularly compelling value proposition to ETH PoW and that, like spinoffs in corporate equity land, the holders of the stub will simply hit the "sell" button and not think twice about it other than "free money". BitOoda has made this argument. Ethereum Classic is the counter to that with a market capitalization of ~\$5.9B. In

fairness, ETC has had a tremendous run-up recently due to both an overall rally but also attention to the ETH PoW fork news. So maybe that number needs to be a bit lower for comparison sake. \$24 implies a market cap of \$2.6 billion.

Sell Sep Basis -22 / Sell Poloniex ETHW/USDT

Trade the [Poloniex future](#) against the implied forward. There is the potential to make something like $72-24 = 48$ per ETH on the trade. The danger here is that there is really nothing to keep the future in line. I have not looked at the contract specification as we are unable to trade this but it looks like they are defining it be something like a "when-issued" market rather than a formal future. Ultimately there may be delivery but the price path has the potential to get out of line without the spot being available for some sort of basis trading. It is the kind of contract that is small enough and the traders emotional enough that there could be some interesting dislocations as participants trade "angry".

Sell Sep-Dec -2

Play for a delay of the ETH fork. The fork occurring has had numerous delays until now. Everything appears to be moving along just fine and according to plan. Still, moving a payment system is big and this is going to demand a lot of careful choreography. One can both expect it to happen and also expect that it gets knocked into October. If that occurs, then buying Sep quarterly futures at -22 and selling Dec quarterly futures -24 is a pay 2 to make 20.

At the prices here (and to be very clear, these calendars are moving around even as I write this), that would be to sell the calendar at -2. If the merge does not happen until, say, October, then the 12/30 basis will look like -22 and the Sep basis will converge quickly to 0: profit of

\$20. If the merge does go through, then one will have basis on at -2 with an ability to earn \$16.58 of net yield (and if there is 100 bps of tightening with commensurate follow through in crypto, then $\$16.58 - \$4.8 = \$11.8$). And if the merge does not happen at all, then basis will likely jump to $\$11.8 - \16.58 (according to our model)

Calendar Spread Table:

ETH Price: 1900		
Forward Date	Market Calendar	Fair Value Calendar
9/30/2022	--	--
12/30/2022	-2	-16.58
3/31/2023	13	-16.58
6/30/2023	3	-16.58

Delay Trade / Scenario Analysis

Scenario	Current Price	Fair Value Price	PnL
Merge occurs on time	-2	Range: -16.6 to -11.8	Profit: \$9-\$14
Delayed Merge	-2	-33	Profit: \$20-\$31
No Merge	-2	Range: 11.8 - 16.6	Loss: -\$14 to -\$19

There is definitely risk here, but our assessment is that a “no merge” loss event is unlikely. It is also hard to assess where actual market basis may go to once the actual merge occurs.

Going with -11.8 basis (the more conservative), and a 20% probability of delay, and a 5% chance of no merge gives:

$75\% * 9 + 20\% * 26 + 5\% * -19 = \11 expected value

We encourage our reader to plug in their own probabilities.

Sell Dec-Mar +13

This is our single favorite trade idea. The Dec-Mar calendar is pricing in zero probability of the merge occurring. Keep in mind these spreads move and the Dec-Mar is currently ~\$13.

Scenario	Current Price	Fair Value Price	PnL
Merge Occurs	13	Range from -16.6 to -11.8	Profit: \$24-\$29
No Merge	13	Range 11.8 - 16.6	+\$1 to -\$5

Some factors to account for:

- 1) Let’s assume that if the Merge occurs it will be prior to the end of the year. Then the consideration for ETHW vanishes as it is part of both Dec and Mar futures.
- 2) If the Merge occurs and is delayed to past Dec 30 AND an ETHW fork is still likely then there is a bonus profit analogous to the Sep-Dec trade above.
- 3) There is risk if the Merge does not occur at all AND funding rates go higher than 3.5%.
- 4) Of course, with spreads like this, there is considerable mark to market risk. Open interest in Deribit Sep is \$98M, Dec is \$85M, and Mar is \$51M. Our perception is that this is option driven and flows have been steadily to calls and call butterflies.
- 5) Related to the above open interest is that many traders have sold Sep and Dec vs spot to play for ETH PoW. Whether the Merge occurs and whether it is on time or not, they will need to buy back their Dec futures. This

has similar upside potential to the downside risk of 3 & 4.

- 6) Among others, a catalyst for this trade working will occur when exchanges other than Deribit list March futures.

For final consideration, let's think about who is on the other side of this trade. The only place where March quarterlies for ETH currently trade are on Deribit (CME, too, but far less liquid). FTX and Binance don't have them. The futures flows for Deribit are mainly options driven. There is not another exchange where market makers for the March contract can lay off their risk via relative value.

The flows for March options have been toward calls as many participants are looking for bullish option structures (butterflies have been very popular).

My best assessment is that the other side of Dec-Mar spread is 1) options order flow and 2) a subset of market makers that are likely going with a heuristic fair value and then moving from that based on flows.

It seems unlikely that some large pool of smart money has lined this spread up at +13. I think it is far more likely that this is an isolated contract with bullish option flows driving its pricing.

Choose your GoT quote to go with:

"There are no heroes ... in life, the monsters win"

OR

"A lion doesn't concern itself with the opinion of sheep"

And: Please reach out with questions, comments, or other... We really like discussing this stuff!

DISCLAIMER: Do your own research. Nothing herein is investment or trading advice. Verify all market data and analysis. Market prices change continuously. All information here is given on a best efforts basis and there is no guarantee of accuracy. Digital Gamma or the author may or may not have positions in the assets or their derivatives mentioned herein.

Digital Gamma, Inc
123 Town Square Place, Suite 619
Jersey City, NJ 07310



throw out a blanket “thank you”. This is also relevant because it involves the potential for a second ETH fork. The mining community seems to be pushing forward toward this although it remains to be seen how serious an effort this is.

Key points on the valuation of the “coin” for such a chain in terms of its use cases lack ... proof. The major stable coins have thrown their support to ETH PoS so that it will be difficult for trading USD pairs unless the miners come up with a credible alternative. This limits the ability of AMMs and DEXs to operate. Frankly, we are not 100% clear on whether dApps can continue to work on ETH PoW although I think it seems unlikely. Relatedly, Byron Gilliam of Blockworks notes that current NFTs will exist on both chains. I’m not an NFT guy but that sounds a bit like people will have to buy their books in both paperback and hardcover. So maybe that’s a use case temporarily as people ensure that they have both copies of their art/claims.

As this is getting closer, it is important to note that crypto exchanges are both supporting ETH PoS as the main chain and clarifying their stances in advance of the Merge. See FTX note [here](#). The important item out of that short note is that ETH futures will settle against PoS indexes. The other key point is that exchange notes and precedent supports them delivering a forked token associated with ETH exchange balances (normally with the caveat of it having more than a de minimus value).

Appendix B: Pricing ETH Forwards

ETH PoS is overwhelmingly expected to be ETH going forward. Presuming that is the case, this has major implications for forward pricing.

TradFi people are familiar with the idea that the forwards market is not a predictor of the future price of an asset, but rather is priced based on the funding costs of the aggregate market. For example, if funding costs are 5% on a \$100 asset, then the fair value of the one year forward for that asset is $\$105 = \$100 \text{ spot} + \$5$ of interest. A buyer would pay a price below \$105 to obtain a better funding rate than otherwise available and a seller would look to collect more than \$5 of interest on a \$100 loan. This is what happens with BTC or any asset that does not pay some sort of income. And this is also what happens with ETH PoW.

ETH PoS, however, pays a staking yield. That means that an investor can buy spot ETH, sell a future, and stake the ETH to earn interest. If the amount of ETH earned is greater than the loss incurred by selling the forward and financing the ETH, this is a winning trade. For example, if the staking yield is 4% and the funding cost is 2%, the one year forward should be $\$100 + \$100 * (2\% - 4\%) = \$98$.

The above is familiar to those from FX markets where forwards are priced based on yield differentials. It is also familiar to those in equity markets where dividend yields have to be taken into account when pricing stock & index forwards.

In addition there is the one-off dividend available to spot ETH holders should the ETH mining community make a go of ETH PoW.

Let's begin by ignoring ETH PoW and coming with an ETH "fair value" forward curve given the

staking yield and the estimated timing of the Merge. Note the fair value curve means that actual market prices may deviate from this fair value, but having the FV helps us either price or understand the deviation. In order to price the curve, we need to have estimates for:

1. USD funding rate
2. Staking yield
3. What portion of the staking yield gets priced by the market
4. Date of Merge

Right now BTC quarterlies at FTX, OKX, Binance are in the 2.5% yield area which is consistent with the current Fed target rate. That seems to be a good place to start.

Current staking yield for ETH to ETH2 is 4%-ish and is expected to go up once PoS goes into effect. The estimates that I have seen point to a higher 6%-ish yield. To be very clear, I'm not comfortable explaining where that comes from nor do I have a high degree of comfort with it. Ledger offers staking via its Lido app and that seems to offer 9.8% yield (with a 10% fee). So 6% seems conservative and reasonable. By point of comparison, that is in line with yields for staking for Avalanche (10%) and Solana (8%), two other Level 1 PoS chains. So 6% does seem reasonable / conservative.

Current market forwards for Avalanche and Solana are about -7.6% and -6% respectively. Using our model of using 2.5% for USD funding, this effectively has both level 1 chains pricing in 100% the staking yield. For example, $2.5\% - (-7.6\%) = 10.1\%$ or ~10% staking yield. Keep in mind that bullish sentiment can push the basis from -7.6% to 0 or even higher. The market can get inefficient, but ETH is far more liquid trading instrument than AVAX or SOL.

Using our assumptions, we get the following for trade date 8/13/2022:

ETH Price: 1900			
Forward Date	Fair Value Basis	Fair Value Calendar	Fair Value Yield
9/30/2022	2.81	--	1.13%
12/30/2022	-13.77	-16.58	-1.90%
3/31/2023	-30.35	-16.58	-2.53%
6/30/2023	-46.93	-16.58	-2.81%

This includes PoW carry until 9/19, then PoS earnings net of 2.5% using 6% PoS yield with ETH priced at \$1900. The calendar spread indicates the dollar value of the basis for each 90 day period. The basis and the calendar are very impacted by assumptions about the USD funding yield and staking yields. Changing the yield by 1% (by either adding 1% to USD funding or subtracting 1% of the staking yield) leads to a calendar spread fair value of -11.8. The sensitivity of the calendar spread is ~\$4.8/%.

Impact of ETH PoW

The above calculations ignore the value of an ETH PoW spinoff. Yet there is clearly at least *some* value to the potential chain fork. If we take our fair value calculated above and we compare it to the market basis, we can get an implied ETH PoW price:

ETH Price: 1900			
Forward Date	Fair Value Basis	Market Price	Implied PoW
9/30/2022	3.38	-22	25.38
12/30/2022	-8.46	-24	15.54
3/31/2023	-20.30	-11	-7.4
6/30/2023	-32.14	-3	-37.2

Worth noting that an alternative way to view this data is to set a value for ETH PoW and then get implied interest rates. My view is that it makes more sense to come up with assumptions about the interest rates and staking yields than it is about the expected price of ETH PoW.

What is clearly interesting is that March and June have implied pricing for negative ETH PoW value. That cannot be. ETH PoW might end up being worthless but it won't cost holders money (one would just abandon it). So that implies some sort of either a mispricing or a mis-modeling. Before looking at that, there are a couple of sources for potential ETH PoW pricing: stETH and ETH PoW futures. Right now stETH is trading 1928 and ETH is trading 1983 which is a 2.8% discount (using CoinMarketCap pricing). Given the lack of liquidity of staked ETH and the prior discount that stETH had due to the Crypto Credit Crisis, it is hard to disentangle what is the illiquidity premium and what is the ETHPoW premium.

On the other hand, the futures are a pure expression of the market's expectation. It is not perfect, as Poloniex and Bitmex are not as accessible as some other exchanges. Still, [Poloniex](#) is trading \$2.4M notional daily and the current price is close to \$72. There is some uncertainty about what market cap that leads to – is the outstanding amount of ETH the same or is currently staked ETH2 going to be left behind? Using the smaller number gives a market cap of $\$72 * 107M = \$7.7B$. Our implied number is $\$25 * 107M = \sim\$2.7B$. These numbers are quite different.