Overview

This is a review of Phoenix Labs' proposal to adjust ETH interest rate models. Block Analytica supports the proposed parameters of 0% base borrow rate and 3.2% optimal borrow rate.

Staking and ETH Borrowing Market Dynamics

ETH staking yields have been trending down consistently since the summer, reaching a recent low of around 3.3% last week before rebounding to 3.8% as of today. Staking yields are heavily dependent on on-chain fee and MEV activity which can shift quickly in varying market conditions. But as total validator count continues to trend upwards, the base staking yield from consensus layer rewards is expected to fall over time, leading to a long term declining trend in ETH staking yield.

[

994×546 62.7 KB

](///makerdao-forum-backup.s3.dualstack.us-east-1.amazonaws.com/original/3X/2/0/20454719a10a6010cf106c6164efd7d40fdd6c89.png)

Source: Lido Dune Dashboard

[

786×389 67.2 KB

](///makerdao-forum-backup.s3.dualstack.us-east-1.amazonaws.com/original/3X/f/6/f6cb2bd2c8bea6f06e1031926a218f2f2656dec0.png)

Source: Lido Consensus vs Execution Rewards Dashboard

Given this structural trend of declining staking yield, it is appropriate to adjust ETH borrowing costs down to facilitate continued ETH borrowing for leveraged staking, which in turn maximizes expected ETH supplier revenue.

Market Equilibrium Estimates

We can estimate potential market equilibria for Spark ETH markets based on various inputs including ETH LST staking yield, Spark parameters, and simple assumptions on user behavior. We compare Spark equilibria assumptions versus Aave under both current and proposed parameters. Note that Aave governance is considering an adjustment to the ETH interest rate model as well, and has passed a Snapshot poll to implement this. Generally, we want to optimize for high supply rates (as this increases participation from ETH suppliers) while avoiding utilization above the optimal level (which will tend to discourage both borrowers and suppliers due to rate volatility, while increasing illiquidity risk).

Source: Spark: ETH Rate Model Change (Oct 2023) Market Equilibrium Tab

Readers can copy the above sheet to test out different model inputs. In the user preferences section, "user LT buffer" refers to the amount of drawdown in wstETH/ETH price the position can withstand before liquidation, while "excess return" indicates the amount of additional yield demanded to maintain the position (to compensate for the additional risk and operational complexity versus simply holding stETH). Generally, lower LT buffer and excess return preferences result in higher equilibrium utilization, borrow, and supply rates. We can see the excess return preference is appropriately calibrated by comparing the mature Aave v3 market's current state versus model equilibria under existing parameters. The model limits the observed borrow rate to no greater than the optimal borrow rate; while this is not strictly accurate, in practice users will tend to unwind borrow positions or supply additional ETH when optimal utilization is exceeded as rates escalate quickly.

[

Chart

1200×742 51 KB

](///makerdao-forum-backup.s3.dualstack.us-east-1.amazonaws.com/original/3X/e/e/eee2c911368add41cb7490d62225bfd2c0822831.png)

Reductions to base and optimal borrow rates on Spark should lead to an increase in utilization and supply rates, which may help drive greater ETH supply participation. It seems that reducing base rate to 0% in particular will have a highly beneficial impact by reducing borrow costs when utilization is low, while incurring minimal increase to ETH market liquidity risk. Reductions to optimal borrow rate bear more risk of allowing utilization to spike to unhealthy levels (above the optimal utilization kink point), although this risk is still contained by high maximum borrowing rates. Note in the chart below the Aave line is flat, as utilization will hit the model's upper bound of equilibrium borrow rate equaling optimal borrow rate, and therefore changes to base borrow rate will not have an impact on equilibrium supply rates.

[

Chart

1200×742 40.4 KB

](///makerdao-forum-backup.s3.dualstack.us-east-
1.amazonaws.com/original/3X/5/8/580eb0e52b51285c720a811e5842935eb09f6372.png)

[

Chart

1200×742 41.5 KB

](///makerdao-forum-backup.s3.dualstack.us-east-
1.amazonaws.com/original/3X/4/7/47912b811cb84b04b6b5095b229e2299366864b2.png)

ETH Market Liquidity Risk

ETH is a primary collateral asset on Spark. As a result, it is critically important for Spark to maintain adequate ETH liquidity to ensure that liquidations can be processed efficiently and ETH users can repay debt with collateral if their position health declines. Reducing the optimal ETH borrow rate will tend to result in a higher equilibrium market utilization, which may increase the likelihood of the ETH market reaching 100% utilization in volatile market conditions.

There are a few ways we can assess this risk of 100% utilization:

- Position Analysis: Review of active ETH collateral positions by size and risk level to determine the likelihood of large liquidations depleting collateral

- LST Analysis: Estimate potential LST discounts and resulting incentives for users in stressed conditions

Position Analysis

Currently, the mainnet Spark protocol has roughly 127,000 ETH ($230 million) supplied. Assuming an initial state of 90% utilization matching the optimal utilization ratio, this implies roughly 12,700 ETH ($23 million) in free liquidity. Discounting any additional supply or borrow activity, it would take a price drop of at least ~49% to fully exhaust this liquidity through liquidations assuming ETH borrowing utilized up to the optimal utilization kink.

Source: Block Analitica Spark Dashboard

Focusing in on specific wallets supplying ETH, we note a total of 16 wallets with at least 1,000 ETH supplied. But only one wallet has a supply position greater than 10% of market size: a Seven Siblings wallet which recently migrated exposure to Spark from Maker core vaults comprising 79,000 ETH collateral and 50 million DAI debt. This account has historically maintained significant overcollateralization at Maker and this is reflected in their high health factor on Spark of 2.4 (indicating ability to withstand a nearly 60% fall in collateral value before liquidation). While such a high degree of concentration with a single user presents added risk, the users long track record of active position management lessens the concern somewhat. Seven Siblings also holds significant free stablecoins (primarily DAI held in DSR) which can be used to reduce leverage when needed. While the risk of liquidity issues impacting ETH liquidations for this user is low, it may have a negative impact on UX as any withdrawals could lead to ETH borrow rates spiking.

[

730×468 52.8 KB

](///makerdao-forum-backup.s3.dualstack.us-east-
1.amazonaws.com/original/3X/a/9/a9633b889608abd06062cf598ef850c4e003af7a.png)

Source: Block Analitica Spark Dashboard

The Gnosis Chain market is relatively safer from this perspective, as a large majority of supplier ETH is from the Gnosis DAO treasury and not used as collateral. While Karpatkey and Gnosis DAO could remove this liquidity at their discretion, this is not expected without notice in advance.

LST Analysis

We base this analysis on the assumption that users will view sparkETH and LSTs as potential substitutes for accessing ETH yield. During market crashes, liquidations and panic selling may cause LSTs to fall below par value, which increases their implied yield to maturity; maturity in this case represents the length of time for an LST withdrawal to be processed via unstaking from the beacon chain.

[

747×237 62.8 KB

](///makerdao-forum-backup.s3.dualstack.us-east-1.amazonaws.com/original/3X/1/a/1a15fb04d4e8a54d164fa8ca72455fca745b2b88.png)

Source: [Spark: ETH Rate Model Change (Oct 2023)](#) Exited Stake Returns Tab

If the implied yield to maturity of LSTs is higher than comparable ETH rates on Spark, users will be less likely to deposit additional ETH on Spark or repay their outstanding ETH borrowings. This in turn may result in ETH market utilization remaining at high levels until LST discounts tighten, which can delay or prevent successful liquidations of ETH collateral.

We can estimate potential queue lengths based on an estimate of how much of the ETH supply could be liquidated and queued for unstaking in a stressed scenario. Even in highly stressed conditions, the queue is unlikely to exceed 30-60 days; see below for model and estimates.

Source: [Spark: ETH Rate Model Change (Oct 2023)](#) Queue Estimate Tab

The stETH discount blew out to 7% during the May-June 2022 market crash, where Terra, 3AC, and Celsius all collapsed in quick succession while staking redemptions were unavailable with uncertain future activation date; we can use this as a reasonable lower bound for LST discounts. Combining with the above model showing slightly more than 30 days to clear the queue, this would work out to a ~140% yield to maturity for the longest time length to clear the withdrawal queue. Given that this is comfortably below the existing maximum borrow rate of 123.2% APR (equivalent to ~240% continuously compounding annualized borrow rate) and supply rate of 116.8% (~220% with continuous compounding), users should continue to have a strong incentive to repay borrow positions or supply additional ETH even in stressed conditions.

In all likelihood, with staking withdrawals now available the stETH discount (and corresponding implied yield to maturity) shouldn't reach anywhere close to these levels, and the existing maximum borrow rate should continue to provide more than adequate incentives to maintain ETH market liquidity. If liquidations push utilization up significantly in the absence of significant LST price discounts, the maximum rate should be even more effective at inducing repayments and new deposits, as there would not be a comparable alternative to achieve comparable yield on ETH or any incentive against leveraged stakers unwinding their positions.

Specification

Update ETH rate model parameters for Ethereum and Gnosis Chain deployments:

- Base rate: 0%

- Optimal rate: 3.2%

- Optimal utilization: 90%

- Maximum rate: 123.2%

References

- Spark proposal: [Proposal to Adjust SparkLend Parameters](#)

- Aave rate model change discussion: https://governance.aave.com/t/arfc-upgrade-aave-v3-eth-pool-weth-parameters/15110

- Aave rate model change snapshot vote: [Snapshot](#)

- Lido dune dashboards:

- https://dune.com/LidoAnalytical/Lido-Finance-Extended

- https://dune.com/LidoAnalytical/lido-execution-layer-rewards

- https://dune.com/LidoAnalytical/Lido-Finance-Extended

- https://dune.com/LidoAnalytical/lido-execution-layer-rewards

- BA Dashboard: https://spark.blockanalitica.com/

- [Spark: ETH Rate Model Change (Oct 2023)](#)