Executive Summary

Isolation mode is a tool for Aave to upper-bound its exposure to catastrophic asset devaluation events.

In short, these are catastrophic events where a token quickly drops to 0, as we have seen with LUNA/UST or FTT during 2022. We cap Aave's exposure to these events by setting a debt ceiling:

the amount of debt that can be borrowed against an isolated asset.

We have adopted a stress-testing

framework to set the debt ceiling, described below. We find that we can set more aggressive debt ceilings for tokens with higher on-chain liquidity. We benchmark the liquidity trajectory of smaller tokens during times of stress by looking at the liquidity of the LUNA/ETH Uni v3 pool during the LUNA crash. We then scale this liquidity according to the on-chain TVL of the tokens under consideration and simulate the behavior of profit-maximizing liquidators.

To ensure the solvency of the Aave protocol, we limit the potential losses from an isolated asset to some percentage of the Safety Module (SM)

. We consider more conservative and more aggressive fractions of the safety module, depending on the perceived riskiness of the isolated asset.

The full paper can be found here

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Measuring Protocol Losses

Fig 1: Estimated losses to the Aave protocol as a function of the debt ceiling. The UNI curve is obtained by scaling the buy-side liquidity available for liquidators at a time of stress. This makes a conservative assumption that liquidations must occur in a single transaction.

We simulate a profit-maximizing liquidator transacting with the LUNA/ETH Uni v3 pool during the LUNA crash. This gives us a conservative estimate of the losses to the protocol from listing LUNA before its crash in May 2022. We then scale this loss curve by a liquidity ratio, defined as the ratio in on-chain TVL between LUNA and the target token, e.g., UNI.

Setting Constraints

Determining the debt ceiling is a balancing act between expected revenue and expected losses to the protocol. However, it is hard to determine the probability of fat tail events, and we often risk underestimating their probability, as we discuss in our paper. Instead, we look to ensure that Aave will remain solvent in these worst-case scenarios. We do so by capping the protocol losses (described above) at some percentage of the safety module TVL:

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We propose the following guidelines:

1. Conservative - 1% of the SM:

If the proposed asset is perceived as risky, we'd want to minimize potential losses at the expense of potential revenues from borrows.

1. Aggressive - 5% of the SM:

If the proposed asset is perceived as less risky, then we'd be willing to risk more of the SM in order to increase protocol revenues.

Results

Using the above guidelines, each tokens liquidity, and the LUNA price/liquidity trajectory during its crash, we obtain the below results (rounded to the lowest million):

Token

1% Constraint

5% Constraint

MKR

$5M

$21M

UNI

$7M

$23M

SNX

$4M

$20M

Benefits of Isolation Mode

Adding assets to Aave increases its competitive advantage relative to other borrow/lend platforms. It also improves user experience by adding more diversity to what can be used as collateral and has various intangible benefits with respect to Aave's brand, adoption, etc.

By considering a range of Isolation modes, we provide guidance to the community on how these parameters can be set depending on the risk appetite for that particular asset.

Conclusion

Similar to other risk parameters, we begin with a risk-off approach. Assigning a probability to a catastrophic asset devaluation is an intractable problem, similar to assigning probabilities to black swan events. For example, none of the available metrics on USDT are actually indicative of the probability that it depegs to 0, since this is mostly a function of Tether's reserves and risk-management department, which we have no visibility into.

Therefore, we set conservative debt ceilings by estimating losses on isolated assets using the LUNA collapse. We then consider capping the potential losses to Aave at 1% or 5% of the safety module.