Title: [TEMP CHECK] Raising the Safety Module's Slashing Percentage

Authors: @tncintra & @maxholloway

Created at: 2023-07-27

Summary

- Aave pays between 39,000 and 56,000 AAVE (approximately $2.75M-$3.9M in USD terms) annually in cost of capital to stakers, for funds it cannot slash.

- Increasing the slashing percentage to 100% would save Aave millions

of dollars per year, and we anticipate it would have neutral-to-positive effects for the module's insurance power.

- We recommend:

- Raise the slashing percentage on stkAAVE from 30% to 60%, and accordingly, lower emissions. After observing impact, we either raise the slashing percentage to 100%, or revert our changes.

- Set the slashing percentage on newly proposed pools to 100%.

- Raise the slashing percentage on stkAAVE from 30% to 60%, and accordingly, lower emissions. After observing impact, we either raise the slashing percentage to 100%, or revert our changes.

- Set the slashing percentage on newly proposed pools to 100%.

- We summarize our research report below, as well as a suggested rollout plan for the new changes, and request feedback from the community on our analysis.

- Our analysis and recommendations are supplementary

to most of the work done by TokenLogic and Llama on the safety module. They discuss the slashing percentage in Part 2, and emissions in Part 4 of their Safety Module upgrade.

Report Link:

https://xenophonlabs.com/papers/aave_slashing_percentage.pdf

Motivation

The slashing percentage determines the percentage of safety module deposits that can be slashed by governance. It currently sits at 30%. In a sponsored by the Aave Grants DAO, we provide a quantitative analysis for why a slashing percentage below 100% is strictly capitally inefficient. At a slashing percentage of 30%, Aave pays between 39,000 and 56,000 AAVE (approximately $2.75M-$3.9M in USD terms) annually in cost of capital to stakers, for funds it cannot access.

Following this forum post, we intend to propose raising the slashing percentage on all Aave safety module pools, including the existing stkAAVE pool, and the new pools proposed by Llama and TokenLogic. We expect these proposals will significantly reduce the current costs of the Safety Module, and make any future pools more capital efficient. Furthermore, they will require negligible technical uplift.

However, before moving to a more formal proposal, we would first like to request feedback from the community on our analysis. We are more than happy to discuss our assumptions, and provide further justification for why we believe this is the correct decision for the DAO.

Capital inefficiency measures the reduction in emissions we can afford by having a higher slashing percentage, while keeping the module's insurance power constant.

Modeling

In theory, stakers demand a lower APR when the slashing percentage is lower, since they have less capital at risk. However, the insurance power

of the safety module is also reduced by smaller slashing percentages. Using a simple risk-return model, we show that the capital efficiency

of the module (i.e., the insurance per unit of AAVE emitted, which we denote as R) increases as we increase the module's slashing percentage.

What makes up the APR?

A standard formulation for understanding the APR of an investment is as some risk free rate r_0

, plus some risk premium r_{prem}

.

$APR = r_0$

- r_{prem}

Let's further break the risk premium into its slashing component (the premium demanded due to slashing risk), and a non-slashing component (which might include, for example, a liquidity premium):

r_{prem}

$= p * r_{slash}$

- r_{other}

where p denotes the slashing percentage. Some might say a "risk free rate" does not exist per se in DeFi; this does not affect our conclusions in any way. In fact, the actual values or r_0

, r_{slash}

, and r_{other}

do not impact our recommendation to raise the slashing percentage.

Modeling Capital Efficiency

It follows that the cost to the protocol

is $R = TVL * APR = TVL * (r_0$

- r_{other}
- $p * r_{slash}$

), whereas the insurance power

of the protocol is $TVL * p$. The ratio of insurance power to cost, which we denote as capital efficiency

, is expressed as:

$C(p) = (p * TVL) \div R = p \div (r_0$

- r_{other}
- $p * r_{slash}$

)

While we can take the derivative of $C(p)$ and show that it strictly increases for p in [0, 1] (which we do in the report), we can observe this easily by plotting $C(p)$:

Intuitively: when we lower p we scale the module's insurance power by a factor of 1, but we reduce the module's costs by a factor of less than 1. This means lowering p does reduce costs, but it reduces the insurance power even more! Notice that this analysis was entirely agnostic of the token[s] held in the pool.

Specification

So far, this exercise has been largely theoretical; we made some assumptions, which we challenged and documented in Section 2 of our report, and drew conclusions from the modeling. These economic models on their own are not enough to know the outcome with certainty. Therefore, we suggest a gradual rollout over the next few months where we raise the slashing percentage, gather data, and decide whether to continue raising it or revert back to 30%.

[

Aave SM

4504×3438 316 KB

](https://europe1.discourse-
cdn.com/business20/uploads/aave/original/2X/f/fa9a825b9a98c9dc57054915bde7daa4f2527ec7.png)

Proposal Overview

Acknowledging that economic models are imperfect, we recommend doubling

the slashing percentage from 30% to 60% on the stkAAVE pool, and waiting some time to gather data on whether our claims hold true. If the module's capital efficiency increases as expected, we may raise the slashing percentage to 100%. Otherwise, we may revert it back to 30% if desired.

Higher capital efficiency means that the DAO can reduce the emissions to the safety module, while keeping the insurance coverage constant, or perhaps even increasing it. For this reason, we recommended in our report to raise the slashing percentage to 60% on the stkAAVE pool, and lower emissions by 80 AAVE/day, from 550 to 470. Using our model, we show that this would retain at least as much insurance power in the module, despite spending less on rewards. This would result in annual savings of 29200 AAVE, or ~$2M USD. We later discuss how this is affected by recent snapshots from TokenLogic and Llama, where they proposed lowering emissions from 550 to 200 AAVE/day.

These are based on 150 days of historical data extracted from this Flipside dashboard and deposit rates from Aavescan. Our data extraction is discussed in the Appendix of our report.

Proposal Considerations

Llama and TokenLogic have already passed a snapshot, along with several other snapshots, to lower emissions to the stkAAVE pool to 200 AAVE/day. This impacts our ability to measure the impact of this recommendation. Measuring impact is crucial: it allows us to test whether higher slashing percentages actually lead to improvements in capital efficiency, allowing us to confidently set slashing percentages at 100%.

Furthermore, the safety module currently sits in limbo between successful snapshots and putting forward AIPs to implement them. Given that our research intersects with an existing snapshot, and to avoid confusion in the DAO, we have chosen to delay our proposal and instead request feedback on the analysis. We are working with several community members on how to best structure a proposal to increase the slashing percentage and accordingly lower token emissions. We have found there is significant interest in experimenting with a higher slashing percentage, and we request feedback from community members on when and how we may best put forward our proposal. The details are outlined below.

Other Considerations

Inelasticity

An assumption we make in our modeling is that stakers are elastic to changes in risk and yield. If stakers are fully elastic, then we expect them to react to changes in risk and yield as we have modeled. However, staking AAVE in the safety module is currently the only venue for earning yield on AAVE while also retaining voting rights. Lack of alternative investments that retain voting power likely makes stakers inelastic: an increase in risk does not lead to stakers withdrawing a portion of their stake. Therefore, it is likely that we observe an even greater improvement in capital efficiency than we estimate in our model.

AAVE Price

An important consideration is how the slashing percentage affects AAVE price in the case of a protocol shortfall. We argue that, if the module must be slashed, the option to slash more

AAVE is positive for AAVE price, and therefore positive for tokenholders generally. If governance can't cover the shortfall because the slashing percentage is too low, it reserves the right to mint and auction more AAVE to meet demands. This is discussed in the Aavenomics documentation for the Safety Module, dubbed a Recovery Issuance Event

.

Even if no AAVE is minted, the inability to cover a shortfall will itself incur negative price impact on the token. We have analyzed the impacts of slippage and sentiment on token price impact following a shortfall extensively in our review of dYdX's safety module. See our analysis here.

In short, a higher slashing percentage increases the chances that governance will (1) be able to cover the shortfall without (2) having to mint and auction more AAVE. These two effects lead us to the conclusion that a higher slashing percentage is good for tokenholders. Crucially, a higher slashing percentage does not mean that governance must slash all tokens in the safety module, it merely gives governance the option.

Integrating with Previous Proposals

Raising the slashing percentage allows us to lower emissions if our goal is to keep the insurance power of the module constant. This allows governance to reap the benefits of a more efficient safety module, without compromising security. Using the current emissions of 550 AAVE/day, our conservative estimate for how much we reduce AAVE spend is 80 AAVE/day, reducing emissions to 470 AAVE/day. However, a previous snapshot from TokenLogic and Llama discussed lowering emissions to 200 AAVE/day, and re-distributing the remaining emissions to newly proposed pools.

Given their proposal is at the snapshot phase, we are awaiting community feedback on our analysis before we put forward a snapshot. We are doing so to avoid confusion and operational overhead within the DAO. Once we have received feedback from the community, we will put forward snapshots to raise slashing percentages on current and new pools, and lower emissions from whatever level they might be at that time.

Disclaimer

This research was funded by a grant from the Aave Grants DAO.

Next Steps

1. Engage in discussion around the analysis and recommendations suggested herein.

2. Following feedback from the forums, put forward [a] snapshot[s] to raise slashing percentages and accordingly lower emissions.

Copyright