Gauntlet - Synchronicity Price Adapter "Killswitch" Functionality for LST Emode

As highlighted previously, the CSPA 2.0 solution would guarantee synced price updates between LSTs and their BASE tokens. Moreover, BGD is in the initial phases of preparing the oracle update for implementation. Currently, for many LSTs, LST/BASE ratios have a lot of natural variance due to the oracle implementation. CSPA 2.0 smooths out this variance, which is necessary for enhanced capital efficiency on emode.

Severe dislocations (i.e. extreme variance) between LST market price and LST smart contract price are extremely rare and unpredictable and could hurt the viability of the CSPA 2.0 solution. To further improve on CSPA 2.0, Gauntlet recommends that the Aave protocol limit LST borrowing power when these abnormal dislocations occur. This can prevent bad agents from taking advantage of extreme market conditions to create insolvencies on Aave. We give our initial thoughts below on how LST "Abnormal" Emode could function, in order to best balance optimized capital efficiency in normal conditions and risk mitigation during abnormal conditions. Due to Aave protocol technical setup, these solutions may not be immediately implementatable; moreover, they may significantly impact user experience. Nevertheless, we provide a vision on how these solutions could look to bring the community together to find the best path forward.

In summary:

- If LST liquidity dries up, we recommend IR curve changes to the BASE asset

- If LST market price depegs (market price becoming very different from smart contract price), we recommend a tiered approach to lower pool LT to liquidate the riskiest users.

What to consider? Liquidity deterioration, price deterioration, dex staleness

1. Sufficient liquidity supports enhanced emode.

Without the necessary liquidity, LST price variance increases. We don't want large emode positions with high LTV when liquidity is low, since it is much easier for those positions to become insolvent with higher volatility.

- If: LST DEX liquidity declines by 30% over a 24 hour period

- Recommend: adjustment to IR Curve for BASE adjustment, double slope 1.

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The above chart suggest that LST liquidity decrease substantially, almost by 50% preceding "icepick" dislocations (May 13), or pool liquidity decreases hand in hand with longer duration LST dislocations (June 9 to June 11, June 12 to June 13), roughly 33%. Outside of LST, the USDC → USDT 3 pool suffered extreme loss in liquidity preceding the USDC depeg.

Increasing slope 1 could decrease the size of LST collateral upon liquidity crunches, significantly reducing the risk of mark to market insolvencies should LST market price drop.

1. Depeg events are preceded by smaller price drops.

If LST market price dislocates by 5% relative to its smart contract rate, it must first dislocate by 2.5%. Severe dislocations often occur suddenly, sometimes after market price has already slightly moved away from smart contract rate.

Because the primary pricing mechanism for the CSPA 2.0 solution is the smart contract rate * BASE, if the market price deviates from the smart contract rate, liquidations will not occur, because the price of the LST on Aave has not changed.

If LST/BASE has dislocated significantly, we want to reduce high LTV emode positioning ahead of further depeg. We present a tiered approach, with different criteria to activate the next level of intervention.

- If: LST/BASE market price has deviated by (1-LT)/2 from smart contract rate

- Recommend: Set LST LTV to 0, Lower LT to LT - (1-LT)/2

- For instance, suppose hypotetically stMATIC LT is 97.5%. If stMATIC/MATIC market price decreases 1.25%, automatically drop stMATIC LT to 96.25%.

- Recommend: Set LST LTV to 0, Lower LT to LT - (1-LT)/2

- For instance, suppose hypotetically stMATIC LT is 97.5%. If stMATIC/MATIC market price decreases 1.25%, automatically drop stMATIC LT to 96.25%.

- If: LST/BASE market price has deviated by (1-LT) from smart contract rate

- Recommend: Freeze LST supply and borrowing, Lower LT to LT - (1-LT)

- For instance, suppose hypothetically stMATIC LT is 97.5%. If stMATIC/MATIC market price decreases 2.5%, automatically drop stMATIC LT to 95%.

- Recommend: Freeze LST supply and borrowing, Lower LT to LT - (1-LT)

- For instance, suppose hypothetically stMATIC LT is 97.5%. If stMATIC/MATIC market price decreases 2.5%, automatically drop stMATIC LT to 95%.

Afterwards,

- If: LST/BASE market price has deviated by x*(1-original LT) from smart contract rate

- Recommend: Freeze LST supply and borrowing, Lower LT to 100 - 2x*(1-LT)

- For instance, suppose hypothetically stMATIC LT is 97.5%. If stMATIC/MATIC market price decreases 10%, automatically drop stMATIC LT to 80%.

- Recommend: Freeze LST supply and borrowing, Lower LT to 100 - 2x*(1-LT)

- For instance, suppose hypothetically stMATIC LT is 97.5%. If stMATIC/MATIC market price decreases 10%, automatically drop stMATIC LT to 80%.

LST/BASE dislocation %

LT

1.25%

96.25%

2.50%

95%

5%

90%

10.00%

80%

20%

60%

The goal here is to prevent any mark to market insolvency from materializing by opening up the riskiest positions at each depeg stage to liquidation, since under the CSPA with only primary pricing, these potentially underwater positions would not be getting liquidated.

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The graph above shows collateral balances at each LTV level (Debt / Collateral) for Polygon v3 MATIC-correlated Emode pool. Notice most users enact a buffer between their LTV and the pool LT, in this case, 95%. If LST/BASE market price is indeed depegging from the smart contract rate, then we want to remove the riskiest positions at the tail end. Other BASE-correlated pools on other chains exhibit similar patterns.

A final consideration we would like to bring up is regarding excessive DEX data staleness.

If there has been no price action or other update to the LST DEX pool beyond a heartbeat time, we recommend pausing this LST market because the data staleness could be due to some potential unforeseen event affecting this LST. We recommend a heartbeat time of 24 hours, given the frequency of DEX updates for LSTs. Should an LST market be paused due to data staleness, a new swap on DEX can trigger the market to unpause.

Ultimately, with the above automated strategies in place, LST Emode can support more aggressive params for higher capital efficiency.

When to return to normal mode?

The emode pool can return to normal functioning when liquidity and/or price recovers.

- Liquidity: After a 24 hour cooldown, LST liquidity has increased since the start of the cooldown.
- Price: If LST/BASE market price has recovered, we can increase pool LT to the next "depeg level" up, as shown by the above table.

Options

Gauntlet preliminarily provides a few options regarding how this "killlswitch" market price feature could work for CSPA.

Option 1

- only liquidity dislocation automated intervention

Option 2

- only price dislocation automated intervention

Option 3

- both liquidity and price dislocation automated intervention

Option 4

- no secondary market price based killswitch for CSPA (not recommended)

We welcome community feedback.