[The new exposure model](), as pointed out in its description, serves as a stepping stone in the development of the Rate System. Its goal is to design a fully automated model in terms of methodology and the governance processes required to update parameters in the protocol, enabling it to respond to various environmental changes. The main goal of the current iteration is to address the bullish market dynamics that result in increased exposure to crypto collateral. To move forward towards automation, BA Labs has decided to transition from spreadsheet-based modeling to Python-based modeling. This shift is crucial not only for enhancing the model's precision but also for taking a step closer towards automation.

Implementation Adjustments

While doing so, we noticed some minor adjustments that had to be implemented to make the model more precise. It is important to point out that these changes will have no effect on Stability Fees apart from some minor rounding errors in the order of 0.02%

, but instead correspond to the proper implementation, allowing for more precision and ease of replication yielding the same results. Once the model will proceed towards the final stages of its design, we will likely share the script publicly, meaning that anyone will be able to calculate and verify the parameters' accuracy with ease.

Namely, the changes are:

- Make the exposure-series continuous
- Change the KFb meta-parameter to be the sum of the previously calculated KFa and KFb
- Increase the model's sensitivity to 0.01% exposures

Example

For the sake of transparency, this is an example of how the stability fees are calculated after implementing the changes.

Let us take the ETH-A vault type whose stability fee is calculated as:

ETH-A: Dai Savings Rate (EDSR while active) + Normal LR Spread + Exposure Spread

The EDSR is still equal to 5%, while the Normal LR Spread is also still equal to 0.25%.

The exposure spread for ETH-based vault types is calculated as:

ES = SR+(K-Ka)*KFa*H(K-Ka)*[1-H(K-Kb)]+[(Kb-Ka)*KFa+(K-Kb)*KFb]*H(K-Kb)

With previous parameters (with KFa and KFb factors adjusted) equal to:

- SR = 0.00%
- K = 27.43%
- Ka = 0.00%
- Kb = 40.00%
- KFa = 5.5% (previously 0.01375%)
- KFb = 40.5% (previously 0.0875%)

The exposure spread would then be equal to:

ES =

= 0 + (0.2743-0) * 0.055 * 1 * [1 - 0] + [(0.40 - 0) * 0.055 + (0.2743 - 0.40) * 0.405] * 0 =

= 0 + 0.2743 * 0.055 + 0 =

= 0.0150865 or 1.50865%

Note that H(K - Kb) is equal to zero since we did not reach the exposure level needed to activate the second kink (Kb).

Hence the Stability Fee would then be:

SF =

= 5% + 0.25% + 1.50865% =

= 6.75865% ~ 6.76%

Which is 0.02% higher than the current SF for ETH-A due to rounding errors.

This was not an issue in the way SFs were calculated in the spreadsheet-based model, but if implemented naively in Python it would have resulted in an ES of:

ES =

= 0 + (0.2743-0) * 0.0001375 * 1 * [1 - 0] + [(0.40 - 0) * 0.055 + (0.2743 - 0.40) * 0.000875] * 0 =

= 0 + 0.2743 * 0.0001375 + 0 =

= 0.00003771625 or 0.003771625%

Resulting in a Stability Fee of:

SF =

= 5% + 0.25% + 0.003771625% =

= 5.253771625%

Meta-parameter Changes

In order to implement the aforementioned adjustments, the only hyperparameters that would need to be changed are KFa

and KFb

for each Vault Type and Spark effective APY borrow rate, by multiplying KFa

by 400 and add to KFb

the value of KFa

, while also multiplying their sum by 400. Hence the changes would result in:

- Increase the ETH KFa

factor by 5.48625% from 0.01375% to 5.5%

- Increase the ETH KFb

factor by 40.49125% from 0.0875% to 40.5%

- Increase the WSTETH KFa

factor by 3.49125% from 0.00875% to 3.5%

- Increase the WSTETH KFb

factor by 13.475% from 0.0250% to 13.5%

- Increase the WBTC KFa

factor by 3.49125% from 0.00875% to 3.5%

- Increase the WBTC KFb

factor by 35.42% from 0.08% to 35.5%

- Increase the Spark KFa

factor by 5.985% from 0.015% to 6%

- Increase the Spark KFb

factor by 33.93% from 0.07% to 34%

Stability Scope Bounded Mutable Alignment Artifact

Changes

Assuming that the aforementioned changes are implemented, we recommend to the Stability Scope Responsible Facilitator to propose an on-chain poll required to incorporate these changes into the MIP104: Stability Scope Bounded Mutable Alignment Artifact as follows:

3.2.2A

¤¤¤

Spark:

- KFa

= 6%

- KFb

= 34%

¤¤¤

14.3.1.3.1A

¤¤¤

ETH:

- KFa

= 5.5%

- KFb

= 40.5%

WSTETH:

- KFa

= 3.5%

- KFb

= 13.5%

WBTC:

- KFa

= 3.5%

- KFb

= 35.5%

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In case this and the WSTETH KFb Metaparemeter change are confirmed, the WSTETH adjustment will override the proposed Metaparameter (e.g. KFb in this post is set to 13.5%, but the one implemented will be 7.5% due to the curve adjustment).

Conclusion

These changes are not intended to alter the output of the Exposure Based Rate System Model. Instead, they aim to adjust the figures required for model implementation through Python-based modeling. Python-based modeling is essential for the future automation of the Rate System calculations, methodology, and governance processes. This includes informing the community, providing the necessary figure changes for the spell-crafting process, and ensuring continuous calculations for the Atlas Risk Dashboard.