Preamble

As pointed out in the Smart Burn Engine - Transaction Analysis and Parameter Reconfiguration Update #3, the Smart Burn Engine (SBE) is of crucial importance for the Endgame Initiative. The previous analyses about the sensitivity to MKR price drawdowns, changes in pool size, and raises in gas fees enabled us to have a complete picture of how the SBE parameters would be affected in case of external events.

The analysis covers the period 21 November 2023 - 14 January 2024, and takes into account the parameters update proposed on 23 November and effective on-chain on 04 December at 14:11 UTC. The update effectively changed the hop

parameter, raised from 6,308 seconds to 15,768 seconds, and the bump

parameter, raised from 20,000 DAI to 30,000 DAI.

Data Gathering

All data is pulled and presented as of 00:00 UTC 15 January 2023.

We pulled data from Etherscan on Uniswap v2 DAI/MKR LP accumulation by the DSS Pause Proxy, as well as DAI tokens Transferred from the DSS Flapper, while ETH prices are weighted average prices across major exchanges. This provides a general overview of the amount of DAI used and LP tokens accumulated which can help determine total execution costs, efficiency, and LP focused metrics.

Smart Burn Engine - Transaction Statistics and Metrics 14 January 2024

Smart Burn Engine - Parameter Configuration 14 January 2024

Further information can be found on the Makerburn site.

SBE Transaction Analysis

For the period 21 November 2023 - 14 January 2024, the SBE has used a total of 20,678,138 DAI - of which 10,350,000 spent and 10,328,138 paired - to accumulate a total of 246,140 units of Uniswap v2 DAI/MKR LP token - of which 89,406 before the effective parameters update and 156,734 afterwards. Compared to 21 November the Uniswap v2 DAI/MKR LP has grown by $32,920,953 in nominal terms (a 68.09% increase) to reach a total pool size of $81,266,825.

In the period 21 November - 04 December, the DAI necessary to be paired has dropped from 19,957 to 19,954 and in the period 04 December - 14 January from 29,942 to 29,932, following the trend highlighted in the previous analyses. This time too, the reason behind the drop is the growth in the pool liquidity size, which comes from SBE's transactions but also due to general increases in the price of MKR.

Distribution of Delay Periods

During the 21 November 2023 - 04 December 2023 period (13.59 days), the SBE executed a total of 186 actions, corresponding to the theoretical maximum of 186 transactions given hop

of 6,308.

On the other hand, during the 04 December 2023 – 14 January 2024 period (40.25 days), the SBE executed a total of 221 actions, corresponding to the theoretical maximum of 221 transactions given hop

of 15,768.

We can see that in both cases, the SBE has transacted at its maximum and, even though some delays were present, they are so small that they do not constitute an obstacle towards the theoretical rate of MKR accumulation.

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Compared to the previous analyses where there were delays up to 5 days in which the SBE did not transact, this time the

maximum delay registered was 6 minutes. This is mainly due to the surplus buffer always being above the 50M threshold which did not hinder SBE's transactions.

Market Impact

The realized Market Impact of the SBE's trades can be calculated by looking at the amount of DAI that must be paired with MKR to provide in the LP, accounting for the 0.3% swap fee charged by Uniswap. To calculate the average market impact of each execution, we use the equation:

Even after the new parameters update, the market impact has declined monotonically to reach levels similar to the beginning of the analyzed period.

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Chart

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Parameter Optimization

For the current pool liquidity size of $81,266,825, parameters would be optimized to reduce costs at bump

= 50,000 and hop

= 26,280 seconds. This can be seen from the following graphs, illustrating the relationship between bumps and costs for the current LP size.

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Chart

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At the same time, it is important to consider the fact that when the next spell will go to the executive vote on 24 January and be executed at the earliest on 26 January, the LP will have a different size. Based on the current daily growth of the LP size equal to $609,441, by that day the pool will be at least $86M in size assuming that the surplus buffer exceeds the 50M threshold soon. Even at this LP size, parameters are configured to minimize costs, hence being optimal.

This is significantly below the sandwich limit bump

after which sandwich attacks become profitable. Thanks to thedefi sandwich tool, we can simulate pool sizes and find at which bump

sandwich attacks are profitable. Given the current size, sandwich attacks are not profitable up to a bump

of 122,800.

Recent developments

After the 14 January executive vote, the surplus buffer went below DAI 50M for the first time since 15 November 2023, after a DAI 4.5M transaction. The executed vote can be accessed at the following link: Maker Governance - Proposal SparkLend Changes, Compensation Distribution, Halting Legacy Streams, Offboarded Delegate Buffer Payments, and Update HVBank doc - January 12, 2024

This has slightly hindered SBE's transactions, as it only activates when the surplus buffer exceeds the DAI 50M threshold. In fact, no new transactions were made after 14 January 00:29:59. Since this has always been the main reason why the SBE did not transact at the theoretical threshold, we would like to mention the possibility of splitting larger withdrawals into smaller ones, in order not to hinder SBE's transactions.

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SBE Parameter Reconfiguration Proposal

Based on the current LP size and the average daily liquidity growth rate of ~$609,441 in the Uniswap v2 DAI/MKR pool which is based on the current configuration of SBE parameters, the pool size will likely be larger when the spell containing parameter changes will go to the executive vote on 24 January. It depends on when the surplus buffer will exceed the 50M threshold. The proposed parameters will allow for cost optimization and sandwich attack prevention, while creating additional protection to increases in gas prices for both the current LP size and the simulated LP size on 24 January.

Therefore we suggest the Stability Facilitator to propose the following parameter changes:

Hop: Increase by 10,512 seconds from 15,768 seconds to 26,280 seconds

Bump: Increase by 20,000 DAI from 30,000 DAI to 50,000 DAI

Stability Scope Bounded Mutable Alignment Artifact Changes

Assuming that the aforementioned changes are implemented, we also propose to incorporate these figures into the MIP104: Stability Scope Bounded Mutable Alignment Artifact as follows:

- 9.1.3.1A: The hop

parameter is: 26,280

- 9.1.3.3A: the bump

parameter is: 50,000

Conclusion

The main takeaways from this analysis are the following:

- The SBE is currently transacting at the theoretical rate of MKR accumulation.
- The surplus buffer is currently below the DAI 50M threshold, which will likely hinder SBE’s transactions.
- The market impact of SBE’s activity is declining monotonically, even after the parameters update.
- Current parameters are not optimized for cost efficiency and should move towards a larger bump

and larger hop

, for the current LP Size.

- BA Labs will continue monitoring the SBE and propose an update to the parameters and meta parameters according to the language in the Stability Scope when it is needed.

References

Data sheets:

Smart Burn Engine - Transaction Statistics and Metrics 14 January 2024

Smart Burn Engine - Parameter Configuration 14 January 2024

More about SBE:

Introduction of Smart Burn Engine and Initial Parameters

Smart Burn Engine - Performance to 30 July 2023

Smart Burn Engine Parameters Update #1

Smart Burn Engine Transaction Analysis #2

Smart Burn Engine - Transaction Analysis and Parameter Reconfiguration Update #3

External Resources:

https://etherscan.io/token/0x517f9dd285e75b599234f7221227339478d0fcc8?a=0xbe8e3e3618f7474f8cb1d074a26affef007e98fb

https://etherscan.io/token/0x6b175474e89094c44da98b954eedeac495271d0f?a=0x0c10ae443ccb4604435ba63da80ccc63311615bc

vote.makerdao.com

Maker Governance - Governance Portal

The MakerDAO Governance Portal allows for anyone to view governance proposals, and also allows for MKR holders to vote.

makerburn.com

makerburn.com

Dashboard for watching DAI minting and MKR token burning in real time.