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Overview

Over the past several months, Chaos Labs has been diligently working alongside GMX core contributors to methodically research, evaluate, and refine the impending deployment of GMX V2. Leveraging sophisticated Agent-Based Simulation Models, Chaos Labs pursues a delicate equilibrium between capital efficiency and risk exposure.

Nonetheless, given the early-stage status of V2, our immediate focus and priority are heavily tilted toward the security and safety of the protocol. We are committed to ensuring a smooth and safe phased launch, continuously monitoring trader activities and system performance, and laying a robust foundation upon which the protocol can reliably expand.

The ensuing set of genesis parameter recommendations is the fruit of our rigorous research process, which involved executing millions of market stress scenarios and Monte Carlo simulations at scale. These simulations included a wide array of variables, such as diverse price trajectories, liquidity models, levels of network congestion, and volatility levels, among others, thereby testing the system's robustness in a myriad of potential scenarios.

Note: The preliminary parameter recommendations are formulated based on a combination of economic-security-driven heuristics, an analysis of trader and liquidity provider (LP) behavior observed in V1, and in-depth research on empirical trading patterns found in centralized exchanges, alongside other empirical evidence. Subsequent to the launch of V2, Chaos Labs will closely monitor the platform usage and iteratively refine our models to favor analysis of agent behavior within the Synthetics environment increasingly. Consequently, these models and parameter recommendations will undergo continuous refinement and optimization, informed by these real-world observations.

Agent-Based Modeling and Simulation Framework

In our comprehensive research paper, we delve into the intricacies of creating Chaos Labs' high-fidelity simulations that emulate the operations of on-chain protocols. Relying on mathematical principles rooted in the interaction between protocol parameters and external variables, we construct models that proliferate a deep understanding of the functionality of corresponding protocols. Despite the intricacies involved, including the nascent nature of DeFI with limited historical data and relatively small datasets, these simulations, coupled with our proprietary simulation cloud, offer profound insights into the operations and potential losses in decentralized finance protocols.

Our simulations are conducted by a simulation executor utilizing a novel agent and scenario model to interact with a dedicated blockchain fork. This unique approach allows us to obtain a comprehensive snapshot of the runtime environment at any given block height. At the same time, agents can interface with GMX V2, similarly to how they would interact in a post-launch environment.

The paper further discusses the use of agent-based and Monte Carlo simulations, capturing the dynamics of various agents in the DeFi ecosystem and how the introduction of randomness can lead to meaningful outcomes. Finally, the paper also presents our innovative approach to computing price trajectories, focusing on overcoming the challenges associated with the geometric Brownian motion model and introducing a more realistic autoregressive volatility model.

For the full exploration of these concepts, please find the Agent-Based Modeling and

Simulations section in our paper here.

Recommendations

The subsequent tables delineate the initial risk parameter recommendations for the Arbitrum and Avalanche deployments. The Chaos Labs complete genesis risk framework and methodology are here- GMX V2 Genesis Risk Framework and Methodology. This paper dissects our investigative approach encompassing simulations, suppositions, analytical discourse, and the scenarios executed as integral components of the scaled Agent-Based Monte Carlo simulations.

The figures in the recommendation tables are based on Option 3, utilizing a kink model, as described in the paper.

Recommendations

Arbitrum

negativePriceImpactFactor

positivePriceImpactFactor

priceImpactExponent

fundingFactorPerSecond

fundingExponentFactor

borrowingFactor

borrowingExponentFactor

maxLongOpenIntereset

reserveFactor

positionFeeFactorPositive

positionFeeFactorNegative

WBTC

5*10^-11 : 10^-10

5*10^-11 : 10^-10

2

2*10^-8

1

5*10^-9

1

$64M

0.9

0.0005

0.0007

WETH

5*10^-11 : 10^-10

5*10^-11 : 10^-10

2

2*10^-8

1

5*10^-9

1

$64M

0.9

0.0005

0.0007

LINK

8*10^-9 : 1.2*10^-8

4*10^-9 : 6*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$2M

0.9

0.0005

0.0007

ARB

8*10^-9 : 1.2*10^-8

4*10^-9 : 6*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.9

0.0005

0.0007

UNI

4*10^-8 : 6*10^-8

2*10^-8 : 3*10^-8

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.9

0.0005

0.0007

LTC

8*10^-9 : 1.2*10^-8

4*10^-9 : 6*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.5

0.0005

0.0007

DOGE

8*10^-9 : 1.2*10^-8

4*10^-9 : 6*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.5

0.0005

0.0007

SOL

5*10^-9 : 1*10^-8

2.5*10^-9 : 5*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.9

0.0005

0.0007

XRP

5*10^-9 : 1*10^-8

2.5*10^-9 : 5*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.5

0.0005

0.0007

Avalanche

negativePriceImpactFactor

positivePriceImpactFactor

priceImpactExponent

fundingFactorPerSecond

fundingExponentFactor

borrowingFactor

borrowingExponentFactor

maxLongOpenIntereset

reserveFactor

positionFeeFactorPositive

positionFeeFactorNegative

BTC.b

5*10^-11 : 10^-10

5*10^-11 : 10^-10

2

2*10^-8

1

5*10^-9

1

$20M

0.9

0.0005

0.0007

WETH

5*10^-11 : 10^-10

5*10^-11 : 10^-10

2

2*10^-8

1

5*10^-9

1

$20M

0.9

0.0005

0.0007

WAVAX

8*10^-9 : 1.2*10^-8

4*10^-9 : 6*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$2M

0.9

0.0005

0.0007

LTC

8*10^-9 : 1.2*10^-8

4*10^-9 : 6*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.5

0.0005

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DOGE

8*10^-9 : 1.2*10^-8

4*10^-9 : 6*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.5

0.0005

0.0007

SOL

5*10^-9 : 1*10^-8

2.5*10^-9 : 5*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.9

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XRP

5*10^-9 : 1*10^-8

2.5*10^-9 : 5*10^-9

2

2*10^-8

1

5*10^-9 : 10^-8

1

$1M

0.5

0.0005

0.0007

Next Steps

We're in the process of enhancing our platform to gather data pertaining to user behavior and patterns concerning V2 usage. In the weeks succeeding the V2 launch, our attention will be predominantly directed toward collecting and synthesizing this data. This will serve as the basis for refining our models, fine-tuning risk parameters, and evaluating user adaptability to fluctuating market fees.

Leveraging this data, we will continuously iterate on our models and simulations to further optimize the protocol risk parameters. We believe in the importance of this intensive analytical phase to establish a robust, secure, and efficient protocol environment, thus underscoring our commitment to maintaining the highest service standards for our users.