Introduction

At BA Labs, we are dedicated to providing comprehensive insights into Spark's economic risk. We maintain an extensive database covering every facet of the Spark lending protocol. To facilitate real-time data visualization, we offer public access to our dashboard at https://spark.blockanalitica.com/. Our dashboard serves two key purposes:

- For Risk Analysts: It allows risk analysts to closely monitor crucial metrics, such as collateral backing DAI loans, collateral at risk during various price fluctuations, parameter adjustments, and user activity.
- For Protocol Users: It enables protocol users to assess the health of the Spark protocol through simple graphs and key performance indicators (KPIs). Users can investigate the collateral supporting the assets they supply, view their wallet pages, and gauge the health of their current positions, including personal liquidation predictions for each user.

Our dashboard is updated regularly to keep pace with the dynamic DeFi landscape. Given that Spark's economic risk continually evolves, our developers maintain an ongoing dialogue with analysts and the Phoenix Labs team. This ensures that we add features that remain relevant to the community's needs.

Introducing the Spark Liquidation Simulator

Responding to user demand, we are excited to introduce a new feature on our dashboard – the Spark Liquidation Simulator. This simulator empowers users to gain insights into potential liquidation scenarios within the Spark protocol.

To access the simulator, follow these simple steps:

1. Navigate to the "Wallets At Risk" tab on our dashboard.
2. Click the "Advanced Simulation" button.

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advanced-liqs-button

1324×921 84.6 KB

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Upon reaching the simulation page, you can:

- Add or remove rows to select multiple assets.
- Modify your asset selections using the dropdown menu.
- Choose a price change ranging from -99% to +100%.

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liq-sim-landing

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Once you've configured your selections to your satisfaction, click "Apply." The page will present aggregated data, two bar charts illustrating collateral assets liquidated and borrowed assets repaid, and a table detailing potential liquidation events in your chosen scenario.

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simulation-example

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Methodology Behind the Liquidation Simulator

1. Overview of Spark's Liquidation Mechanism

To better understand our methodology, let's first get an overview of how liquidations function within the Spark protocol:

- Liquidation Threshold:

Spark, as a fork of Aave v3, employs a parameter known as the "liquidation threshold." This parameter determines the maximum borrowing limit against a specific asset, ensuring a minimum level of over-collateralization.

- Health Rate:

Users can utilize various assets, each with its own liquidation threshold, as collateral. Their overall health is assessed through a metric called the "health rate." This rate is calculated as the ratio between the user's total active collateral (sum of each asset's supply amount multiplied by its liquidation threshold) and the total amount borrowed. If a user's health rate falls below 1, their wallet becomes eligible for liquidation.

- Liquidation Process:

Liquidators have the ability to trigger the liquidation of a user's debt position. The amount they can liquidate is determined by the "close factor". When the health factor is between 0.95 and 1, the close factor is set at 50%, allowing for the partial liquidation of a debt position. If a user's health rate drops below 0.95, the close factor increases to 100%, enabling a complete liquidation of the debt position.

- Liquidator behavior:

In cases where a user has multiple assets borrowed, liquidators typically target the largest debt position. When a user supplies various collateral tokens, liquidators choose based on the amount supplied and the associated liquidation bonus for each collateral.

2.Simulating liquidations

When simulating liquidations, such as in the "Wallets at Risk" tab on our dashboard, we aim to replicate real-world behavior. Instead of assuming sudden and extreme price crashes, we simulate gradual changes over multiple blocks. In practice, this means that a user's health rate typically only slightly dips below 1, resulting in the partial liquidation of 50% of one of their debt assets. Subsequently, their positions returns to a healthy state. In normal circumstances, we rarely observe a user's health rate dropping below 0.95. Extreme scenarios, like black swan events, frozen markets, a shortage of liquidators, or bad debt, are exceptions to this rule.

In our simulations, we emulate this behavior by consistently liquidating 50% of the largest debt.

Another observation from our years of experience is that liquidators tend not to liquidate more than $5m of a particular debt at once. We've incorporated this constraint into our liquidation model.

It's important to note that in the liquidation simulator UI, the price changes you select take effect instantly. Consequently, depending on the severity of the changes, you'll likely see most users' health rates fall below 0.95. Additionally, we've removed the usual maximum $5m constraint, allowing for larger liquidation predictions in this simulation.

3.Processing simulations

The parameters you select through the user interface are sent to our backend, where we leverage a combination of Python and PostgreSQL for rapid processing. Here's an overview of our methodology:

- We begin by filtering wallet addresses of users with active borrows and involvement with at least one of the selected assets, significantly reducing the number of users to process.
- We extract token positions for the selected users and apply the chosen price changes to the respective assets.
- The modified positions are then processed through our liquidation logic, aiming to mimic the behavior of a liquidator.
- Our simulator calculates the most profitable liquidation scenarios based on factors such as debt size, collateral size, and liquidation bonuses for different collateral types. This is particularly valuable when users supply and borrow multiple assets.

We Encourage Your Feedback

We value your input and insights. As you explore the Spark Liquidation Simulator, we encourage you to provide feedback, report any bugs you encounter, and share your experiences with the community. Your feedback is essential in helping us improve and enhance our dashboard further.