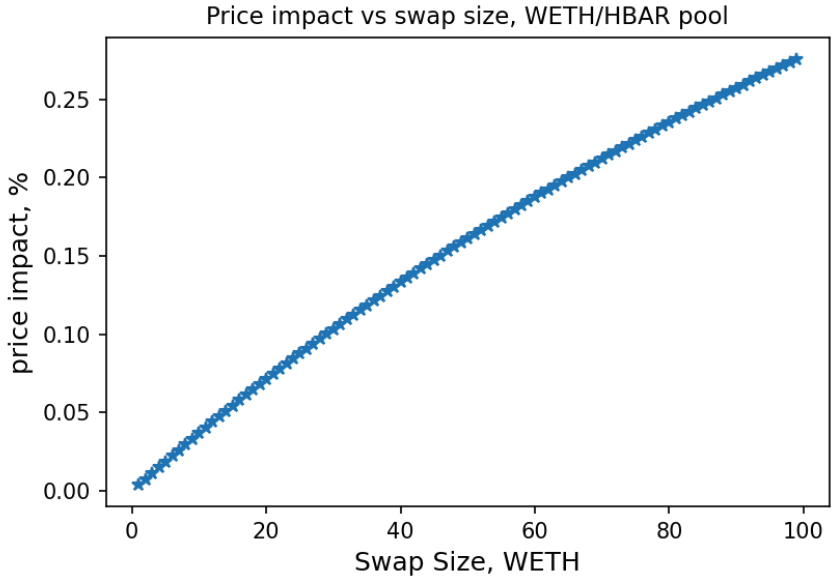
WETH Risk Parameters for Bonzo Lending

Liquidity analysis - currently there are approx 6mln HBAR tokens and 259 WETH tokens in the largest WETH liquidity pool in Saucerswap. It is a V2 pool (similar to UniV3 AMM mechanism) and liquidity HBAR/WETH is evenly distributed.

Supply Cap.

Supply cap determines the maximum amount of a token that can be supplied to the protocol and, therefore, how much of it can be used as collateral. As the supply of the token in the protocol grows, so does the debt collateralized by that token. When the price of collateral drops significantly due to severe stress events, the amount of collateral that needs to be liquidated also increases. A high volume of liquidations can lead to large price slippage on DEXes, such that the liquidation could become unprofitable for liquidators, resulting in bad debt accrual for the protocol. In order to minimize the risk of the protocol becoming insolvent, the supply cap can be defined in such a way that during times of stress liquidations would be successful, assuming healthy and rational liquidator activity.

Saucerswap is the main DEX on Hedera and we check the relationship between the swap amount and the price impact on the WETH token.



Conservatively, the supply cap amount should be less than the swap amount in DEX that leads to the price impact greater than the liquidation bonus (otherwise liquidation is unprofitable and this could accumulate bad debt).

$$C \leq \frac{LB}{1-LB} x$$

Where x is the number of tokens (assuming constant product AMM).

However, we need to consider that both WETH and HBAR have deeper liquidity in a broader market, outside of Saucerswap. If the price in DEX deviates significantly from the market price, arbitrageurs would correct it. Price recovery time is unknown, but the larger the deviation the quicker arbitrageurs would react (shorter recovery time). Therefore if we want to be more capital efficient and push the supply cap higher, we can set liquidation bonus

larger - first, it gives the room to safely increase supply cap without impacting the price on DEX more than LB, second, it reduces price recovery time - the larger the spread between DEX and market price, the quicker it gets arbitraged.

3 ways to define the supply cap:

1. Conservative - assuming if all supplied amount gets liquidated, it is still profitable for liquidation:

$$C_c \leq \frac{LB}{1-LB} x$$

2. Realistic - conservative scenario adjusted by LTV:

$$C_r = C_c + C_c * (1 - LTV)$$

3. Capital efficient - considers the broader market liquidity for token and applies the multiplication factor (the deeper the liquidity in broader market, the higher the multiplicator):

$$C_r = C_c + C_c * (1 - LTV) + C_c * \alpha$$

Liquidation Bonus
Larger LB allows to increase supply cap - liquidations are profitable for larger swaps.

LTV
For WETH, LTV should be set comparable with LTV for WETH in other protocols (80% as in Aave V3 Core).

LLTV (liquidation threshold)
In other protocols the gap between LTV and LLTV for the WETH market is around 2-3% - LT around 82-83%. However, we can use a larger gap between LTV and LLTV to increase capital efficiency - first, it allows us to slightly increase liquidation bonus without hurting the borrower's experience - they have a longer time to react. Increased LB allows safely set larger supply caps.

Reserve Factor
The reserve factor for WETH in Aave is 15%, and should be increased in Bonzo to cover risks due to low DEX liquidity.

Parameter suggestion for WETH Market in Bonzo (3 scenarios)

Risk Parameter	**Conservative**	**Realistic**	**Capital efficient**
Supply Cap	15	35-40	43-45
LTV	0.75	0.8	0.8
LLTV	0.77	0.83	0.86

Liquidation Bonus	0.02-0.04	0.05	0.05-0.07
Reserve Factor	0.25	0.2	0.2

Close factor - should not be 100% to avoid full liquidations of large positions - liquidity in pool is not deep. Normally 50% is an industry standard for static liquidation mechanism - large enough to get positions to hf>=1.

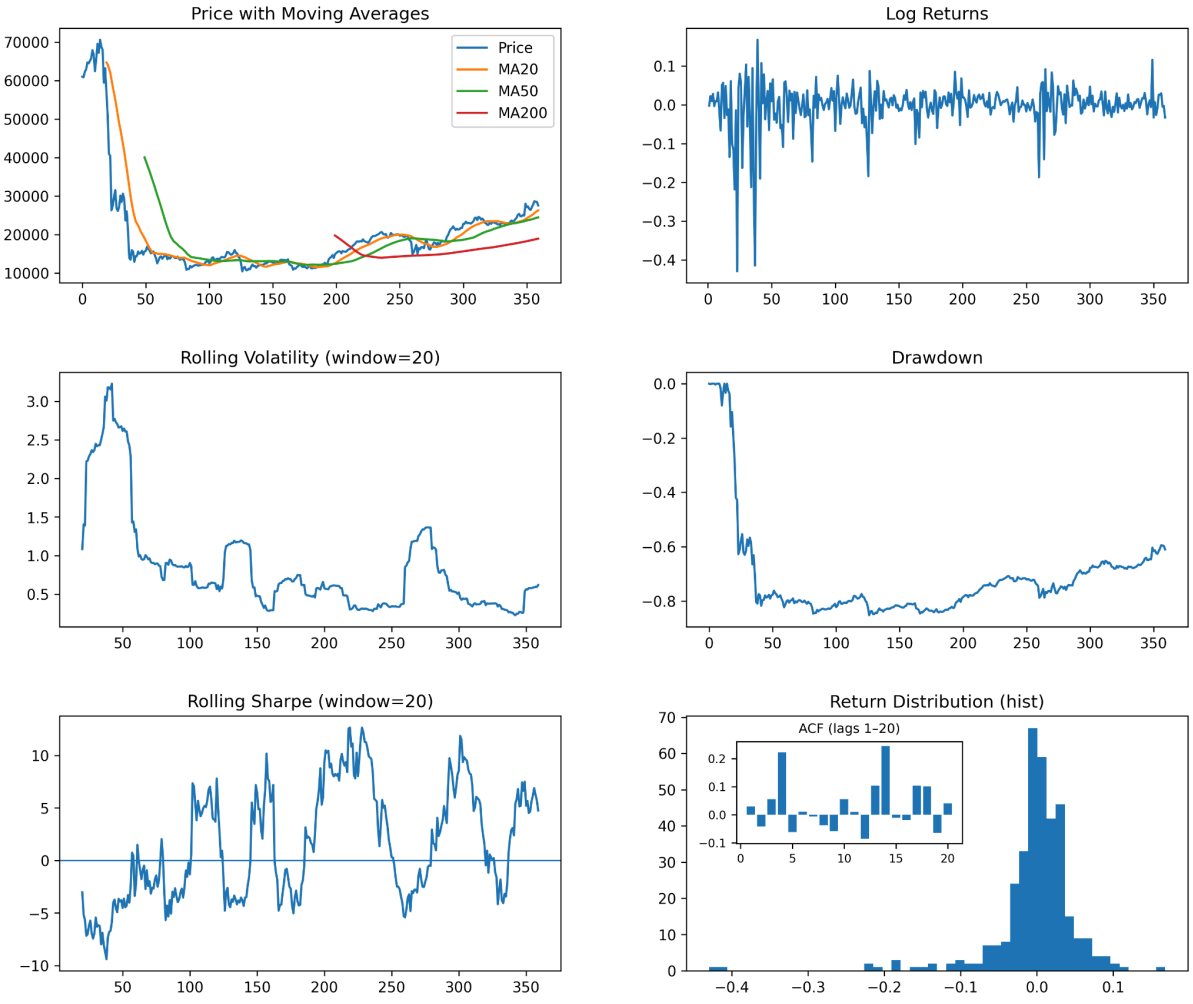
To add up to 1mln of weth to bonzo - we need to be able to swap around 160 WETH with the price impact < LB.

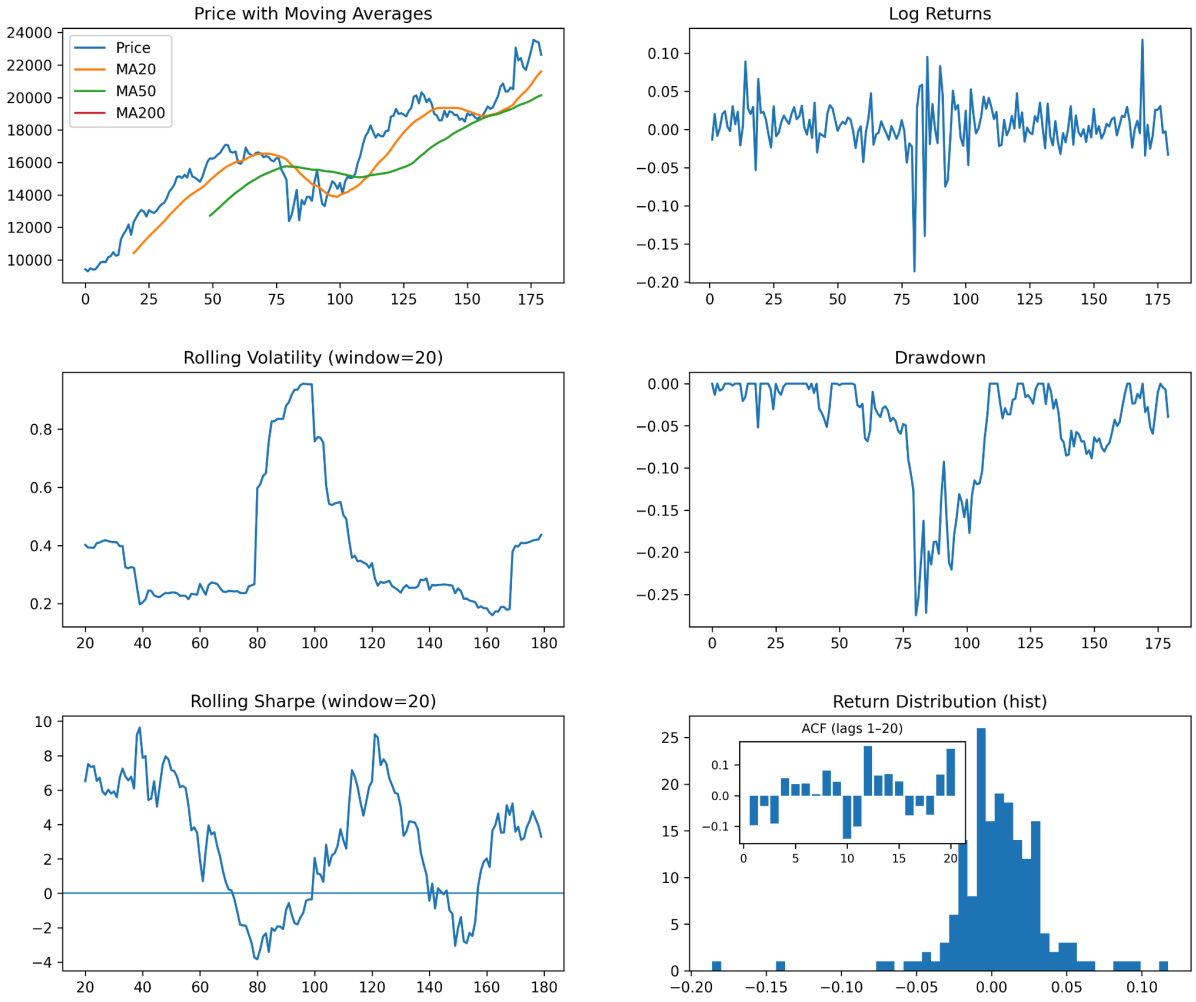
Providing WETH/HBAR liquidity to Saucerswap

HBAR/WETH price analysis for the last year and 6 months:

1. Moving average for short, medium and long terms: price is staying above MA20/MA50 - volatility is clustering upward, and diverges from MA200 (long term), mean reversion is higher - we need wider ranges to provide liquidity.
2. Log returns (measure short-term price velocity) - big return spikes, liquidity can get unbalanced, we need a wider range of liquidity.
3. Rolling volatility (20days rolling) - there are periods of high rolling volatility, which means price was moving fast. Another evidence to widen liquidity provision.
4. Drawdown - how far price is below the prior peak. There were periods of deep drawdown, meaning the high risk of impermanent loss. Another reason to have wider liquidity provision.
5. Return distribution - tail events with up to 20% price move, but most of the time price does not move beyond 5%. ACF shows that most of the time behavior of price is trending, but sometimes bounces back. Most of the time high ACF - better to keep wider range of liquidity.

WETH/HBAR Price Analysis, 365 days





One year and 6 months price analysis both suggest that we should keep liquidity in a wider range. How wide should it be? First, simply looking at the return distribution we can see that price rarely moves beyond 10%. By adding in a 20% price movement range symmetrically we cover most tail events.

How big will be price impact in a concentrated liquidity setting? We need to safely swap around 160WETH in case of liquidations and have price impact <LB.

Let $\delta = 0.20$, $\gamma = \sqrt{(1 + \delta)} = \sqrt{1.2} \approx 1.095445$. For a symmetric range $[P_0/(1+\delta), P_0(1+\delta)]$ with price inside, the token0 required for liquidity L is:

$amount_0 = L * (1/s_0 - 1/(s_0\gamma)) = (L / s_0) * (1 - 1/\gamma)$

At the center, 500 WETH of value splits roughly 50/50, so token0 side ≈ 250 WETH.
Define $F = 1 - 1/\gamma = 0.0871291$. Then:
$L_{add} = (250 \times s_0) / F$.

Baseline active liquidity near price: $L_{base} \approx \sqrt{(R_0 R_1)} = R_0 \times s_0 = 260 \times s_0$.
Hence total liquidity $L_{tot} = s_0 \times (260 + 250/F) = s_0 \times 3129.3064$.

$1/s_1 = 1/s_0 + \Delta x_{eff} / L_{tot}$, where $\Delta x_{eff} = (1 - f) \times \Delta x = 159.52$.

Because $L_{tot} = s_0 \times 3129.3064$, ratio $s_1/s_0 = 1 / (1 + \Delta x_{eff} / 3129.3064) \approx 0.951496$.

Post-trade spot: $P_1 = s_1^2 = P_0 \times (s_1/s_0)^2 \approx P_0 \times 0.905345$ (≈ -9.47%).
Average price: $P_{avg} = (1 - f) \times s_0 \times s_1 = P_0 \times (1 - f) \times (s_1/s_0) \approx P_0 \times 0.948642$.

Impact = $1 - (P_{avg} / P_0) = 1 - (1 - f) \times (s_1 / s_0) \approx 5.14\%$.

For the current liquidity pool (260WETH and 5.9mln HBAR price impact would have been around 38-39%.

Conclusion:

Recommended Risk parameters for WETH market:
LTV - 0.7
LLTV - 0.75
Liquidation bonus - 10%
Close Factor - 50%
Reserve factor - 20%

If the maximum collateralized amount of debt will get liquidated, that will be around 5-6% price impact. We need to revisit LPs in Saucerswap weekly and/or when price moves more than 10%.