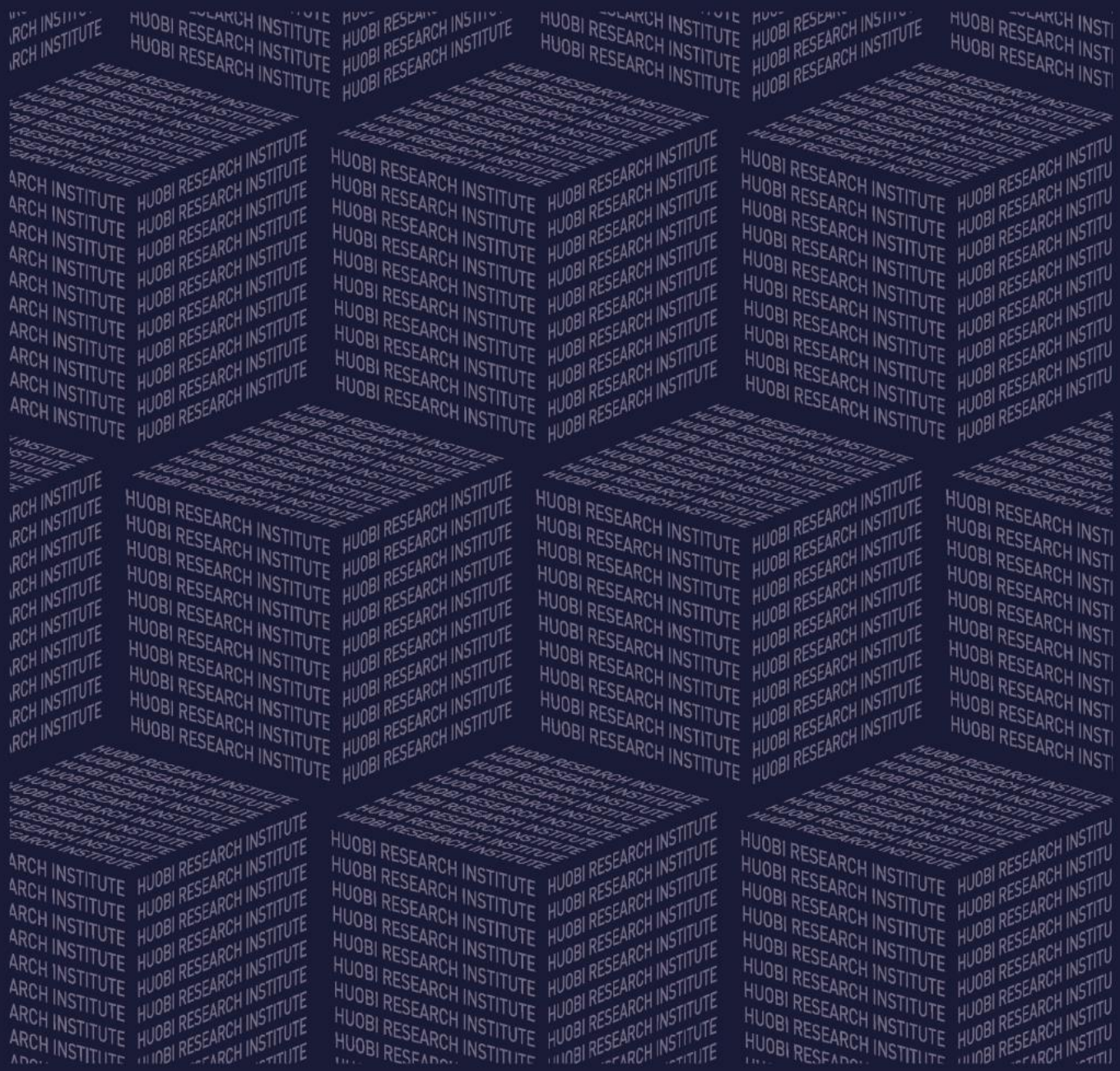


What can we learn from the Luna Bloodbath?

Huobi Research

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Abstract

Luna prices fell from US$87 on 5 May 2022 to US$0.0005 at the time of writing. Terra's widely adopted stable coin UST fell from the peg of 1:1 USD to 0.03:1 USD for the lowest price. The damage of the UST also affects the entire cryptocurrency market cap and triggers a firesale of BTC from 1.7 trillion to 1.2 trillion. The panic attack of UST also spread to other stablecoins. USDN, backed by Waves, depegged to 0.7, while USN, backed by Near, fell to 0.97, USDD from Trx got down to 0.97 and even USDT fell to 0.985, composing a systematic downfall.

How did all these happen? And what can we learn from this crisis?

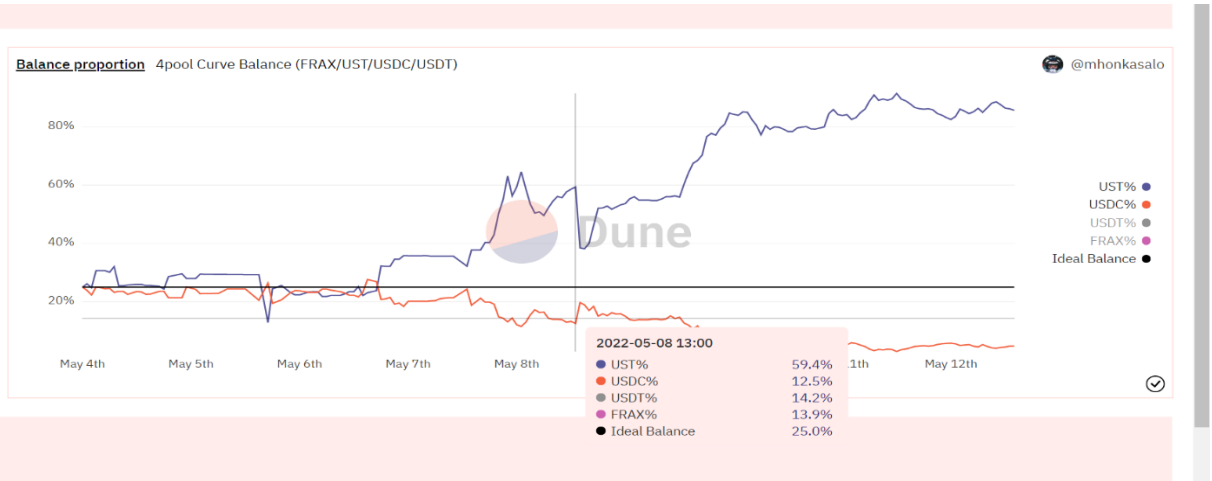
Portfolio rebalancing is a strategy to protect the overall PnL against a free fall of marketcap and liquidity crisis. As such, the overall asset management strategies are of vital importance.

In this report, we explain step-by-step the liquidity crisis of Terra Luna.

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1. The Soros Type Attack

The coordinated attack starts from 3pool. As 4pool data is launched, more UST liquidity is deposited into the curve. As the pool liquidity is imbalanced, the attacker made use of this opportunity to start swapping UST for USDC at more than 84 million.



	Participants	Total	Average	Median
Withdrawers	11400	$1,419,728,837	$124,538	$2,101
Depositor	5371	$224,630,177	$41,823	$1,000

Figure 1: 4pool liquidity

Source: https://dune.com/mhonkasalo/4pool-Curve-FRAXUSTUSDCUSDT

Then, the peg was restored by the attempt to sell ETH back to the exchange to restore the UST peg. This allows the attacker to evaluate how much liquidity to sell UST in order to trigger depeg. Such an attempt gives the attacker a confidence to destroy the UST and LUNA model by quantifying a full attack plan.



Figure 2: UST depegged

Source: CoinMarketCap

2. Things Go South

The ETH sent to the exchange for selling as depeg accumulates a selling pressure. The attacker knows that people would use their purchasing power to restore depeg at a centralized exchange. The attacker then knows the CEX is the battleground and forms a liquidity pool for a full scale attack.



Figure 3: Hero's rescue

Source: https://twitter.com/mhonkasalo/status/1523324834247106560

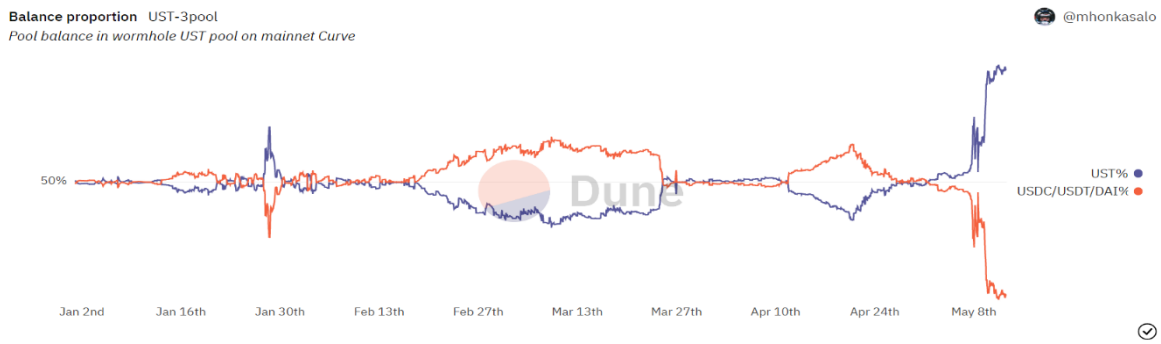


Figure 4: 3pool imbalance

Source: https://dune.com/mhonkasalo/4pool-Curve-FRAXUSTUSDCUSDT

As the defense liquidity pool is played out, the attacker keeps forbidding the exit position of the UST bought by Hero#1 and Hero#2 as an arbitrage trade. More than 580 million of UST cannot be sold as an exit position. With the knowledge that defences are down in guarding the peg, the attacker launched a full scale swap on the curve. This causes a perfect imbalance of the UST in the curve pool, while the farming mechanism will balance the asset of the pool to form an equivalent ratio on the net asset value of the liquidity pool. This intensifies the supply of Luna in the market.

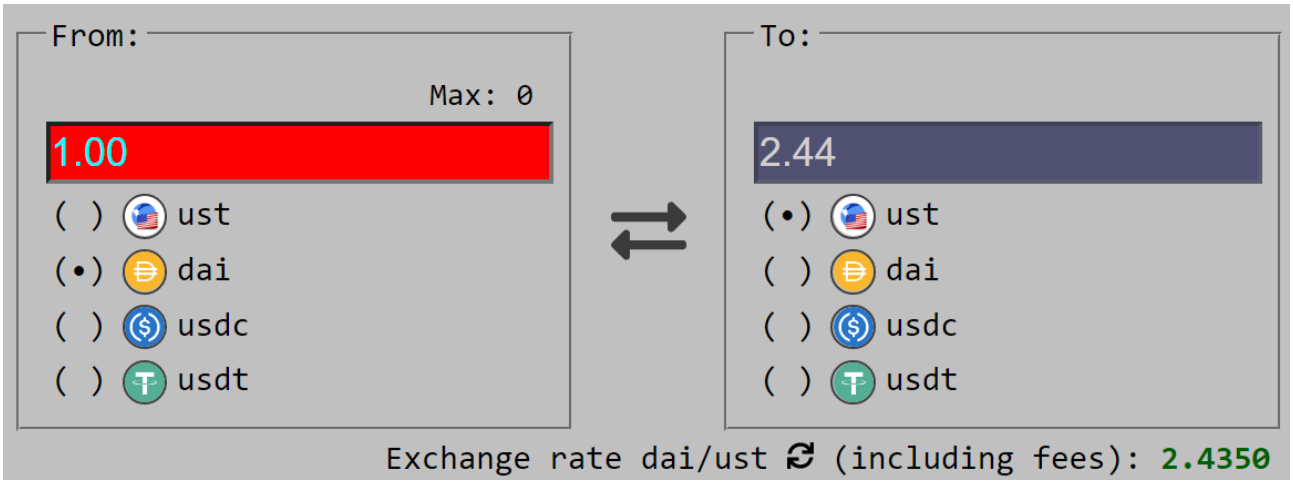


Figure 5: Curve's liquidity pool

Source: https://curve.fi/factory/53

3. The Big Short

The attacker is now aware that the peg cannot be guarded quickly with an external liquidity pool, as well as the algorithm and LFG. Hence, the next part of the attack plan can now be executed. Luna shorts are imminent. After the 4-pool UST crashed, anchor depositors quickly withdraw UST and swap to Luna. The swap results in a selling pressure of Luna and reduces Terra' s liquidity as the primary source to buy back UST. Meanwhile, the attacker sold short UST at the CEX to depeg UST. LFG quickly deploys capital, as usual, to sell assets like BTC to buyback UST, as a secondary source of liquidity. However, since the attacker has more than 1.5 billion of liquidity as expected, Terra reserves continue to suffer from draining out. It is because it is not unusual for players in the crypto industry to prepare more than a US$1.5 billion liquidity to compete in the UST battleground. As BTC is sold by LFG, the whole crypto market suffers from a massive selling pressure. This benefits the attacker to its short position from Luna to BTC and other alts with high beta. Regaining the loss of discounted UST from the attacker from just a part of the profit of the short positions, the attacker has more liquidity to pull the price of Luna down as well as BTC to liquidate the asset portfolio of the Terra chain and LFG. The attacker continues to benefit from the short position with its UST and BTC as collateral, and sell BTC and UST continuously to liquidate longs positions of other players in the market.

4. The Liquidity Crisis

The whole Terra chain suffers from a liquidity crisis that the entire Luna marketcap cannot balance out its UST marketcap. Luna then suffers from a total loss of liquidity. UST holders continue to swap to Luna as exit positions, including those in the entire Luna ecosystem. Some of them even suffers from web suspension during fund withdrawals.

5. Effects on Terra and Cosmos Ecosystem

Most of Luna and Cosmos protocols go down with Luna's freefall. The largest yield bearing protocol, Anchor, fell from 2.17 to 0.07 in just a few days. Mirror, its stock-mirroring trade protocol, governance tokens fell from 1.165 to 0.236 in three days. Most of the TVL is liquidated at the time of writing. As one of the IBC gang goes down with the ship, Cosmos' protocols also sank. Omosis, Cosmos, Juno, Secret Network, Akash and Rowan fell to 35.45%, 20.26%, 31.94%, 20.27%, 32.16% and 30.6% respectively. The attack spreads the fear to other stablecoins that had connections with IBC gangs and Luna. Although no investment advice is provided, hedging is of vital importance while investing in volatile assets on Terra and Cosmos chains.

6. How to Deal with the Repeg



Figure 6: UST circulating supply changes

Source: Smart Stake

Luna Circulating Supply Changes

Date	Circulating Supply	Liquid Circ Supply	Supply Change	Supply Reduction
2022-05-12	158,838,194,176	158,254,000,000	157,261,234,176	-10,000,000,000
2022-05-11	1,576,957,952	1,341,800,000	1,190,951,936	-1,092,904,192
2022-05-10	386,006,016	147,286,000	40,186,852	98,047,784
2022-05-09	345,819,168	94,639,800	2,683,451	138,234,640
2022-05-08	343,135,712	91,357,100	957,201	140,918,096

Figure 7: Luna circulating supply changes

Source: Smart Stake

There are several governance proposals that provides an exit plan for the unsellable UST on the market. “Burn The Remaining UST in the Community Pool + Cross-Chain Liquidity Incentive UST” is proposed to provide more liquidity to UST holders. Another proposal also triggers the minting of more than 10 billion Luna to buy back UST. In the proposal of “LUNA Go Forward Proposal”, the minted Luna is suggested from the distributions to the following:

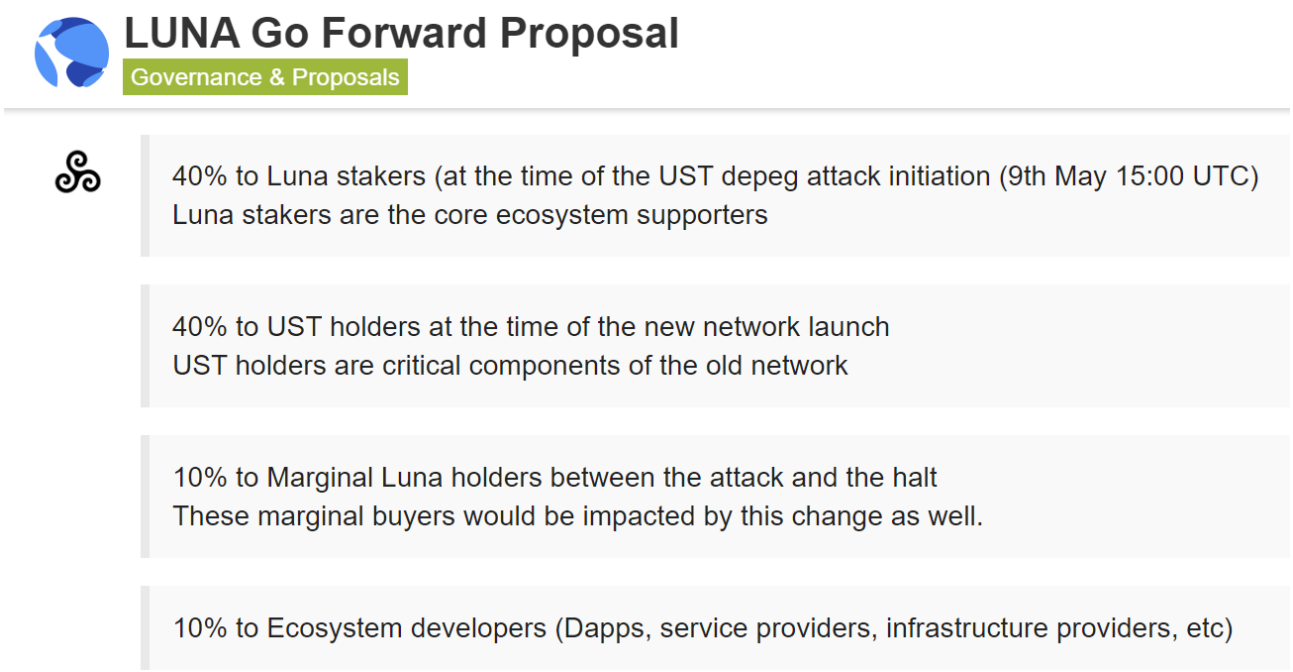


Figure 8: Terra’s governance proposal

Source: https://agora.terra.money/t/luna-go-forward-proposal/7136

A large amount of Luna is minted to flood the existing Luna marketcap to exit unsellable UST.

7. How to Deal with your Portfolio

How does the market work? Most assets go up and will not keep going up. Eventually it goes down and hurts the bulls. So here is what hedging could benefit your net portfolio gains.

When a certain profit is large enough to cover the trading costs, a percentage of the profit can go to inverse positions to act as insurance fund. For example, if you Luna gain is more than 20%, you can use 8% of the 20% PnL to buy inverse position, or to initiate a leverage short on futures trading. When doing leverage shorts, a few attempts can be done to compose to overall short position. For example, with 8% of the overall portfolio PnL, the 5% can be divided into 3 parts with each 1.6% of the shorts going into Luna's short. The portfolio rebalancing can thus be done. If Luna goes up by 30%, your shorts will be wiped to close to zero and the 8% of the original overall portfolio PnL is gone. However, due to the increase of Luna PnL to 30%, say 10% of the PnL rebalances the loss in short positions while another 2% will be kept as overall profit and transaction costs. Due to the mechanism of Luna's token, the unrealized loss will not result in liquidation of the entire portfolio and act as an insurance if Luna goes down more than 20%. In the case where Luna goes to zero, Luna's insurance acts as a gain of more than 1200% to rebalance the entire Luna portfolio. Say the original 8% deposited into Luna will increase to 96% of the overall Luna portfolio to balance the loss.



Figure 9: Luna's short hedging

Source: tradingview

Another quick take is to withdraw the principal when overall Luna portfolio PnL is more than 50% - 90%. First, the principal is protected. The investor can quickly use the fund for other trades or go to liquidity mining or staking as an interest-bearing asset with daily or weekly APY distributions to regain transaction costs. Second, a part of the portfolio, say 10% of the 90% PnL is used to do leverage shorts or buy Luna token. If Luna keeps going up, the Luna short goes to zero but is rebalanced by the gains of Luna. The investor loses close to nothing while

the transaction costs are rebalanced by the staking or liquidity pool APY returns. When the free fall of Luna is imminent, the Luan short provides 12x returns from 10% of the overall PnL to 120%. While the subtotal loss of 100% the original profit is wiped out, the 120% of the gain completely rebalances the loss with another extra 20% of profit. Portfolio rebalancing comes with a leverage to protect investors. This strategy can be applied to other areas for portfolio management.

8. Dealing with the Peg in the Future

Strategies must be deployed to guard the overall Terra chain assets. As the less volatile stablecoin is backed by a more volatile asset like Luna, the collateral has to be rebalanced with less volatile tokens that do not suffer from systematic risks of the overall crypto market. For example, in our previous Luna confidence model, the protection liquidity pool should be composed of tokens with less volatility. For example, the BTC raised can be used to borrow USDT or USDC as a collateral, while opening short positions with some longs as insurance during a market liquidity crisis. The key point is that the insurance pool cannot go down with the remaining of the crypto market, and share the profits of the attackers. Opening Luna shorts are a chance to share the profit of the attacker, while Terraform Labs holds a lot of Luna tokens. An overall market making strategy can damage or liquidate the attackers if Terraform Labs aggressively buys back Luna at lower prices and sells the shorts to the attackers. Also, closing the shorts with an overall PnL can rebalance the loss off the long position opened previously.

9. How Does Money Work?

Money always works for the handful 1% in the world. It is not suggested to deny the dream and goal of decentralization. It is being said that some centralized centralization is beneficial to perform asset rebalancing and management against coordinated attacks. Out of the crypto world, this power is owned by asset managers, hedge fund traders and venture capitalists. While we keep chasing the goal of decentralization, some centralized teams must deploy strategies to protect against another coordinated and centralized attack against supply elasticity, like what was written in the Luna confidence essay previously. More collaterals and risk diversification can be done with an increase of Luna marketcap by the centralized team to protect the decentralized world. This also applies to tokens with maximum supply. It is because when

circulating supply is limited in the market, a handful of wealthy individuals can deploy coordinated strategies to manipulate the remaining circulating liquidity on the market. Chains with maximum limited supply should be aware of and protect themselves from attacks similar to this Luna liquidity crisis. Afterall, decentralized stablecoins are of vital necessity to the development of the whole cryptocurrency ecosystem against regulatory hunts.

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