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UST LUNA

UST Death Spiral Recap

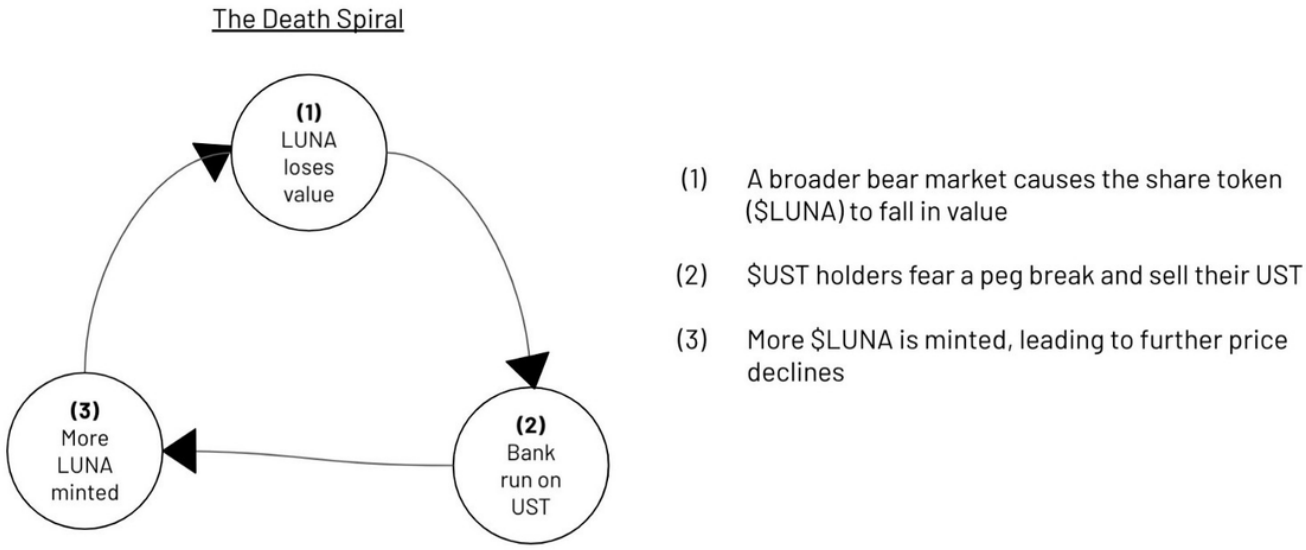
By Westie / May 16, 2022 / 7 min read

Key Takeaways

- The greatest risk for algorithmic stablecoins is the “death spiral.” In this scenario, the stablecoin falls below peg, investor’s lose confidence, more of the share token is issued and sold, and the cycle repeats. This fate befell UST, the native stablecoin for Terra, which dropped in price to a low of $0.08 on May 13, 2022.
- Large LUNA price drops coincided with an exponential rise in LUNA issuance, the result of hyperinflation through arbitrage minting, which in turn weakened the security of the Terra network. With millions of dollars in non-Terra collateral still sitting on Anchor, Terra is at risk of a network takeover.
- Do Kwon, on behalf of Terraform Labs, has already initiated two proposals for a new Terra fork without UST, distributing the new LUNA supply to necessary stakeholders: builders, infrastructure providers, and holders of UST and LUNA at different snapshots.

One of the largest market concerns at the moment revolves around the price parity of TerraUSD (UST), the largest algorithmic stablecoin by market capitalization and primary stablecoin of Terra. For the uninitiated, UST is meant to keep peg through an on-chain redemption mechanism where, at any point in time, a user can mint 1 UST by burning $1 of LUNA, and vice versa. This mechanism creates an incentive for arbitrage whenever UST drifts from a dollar. If UST goes above peg a user can buy $1 worth of LUNA, burn it for 1 UST and profit the difference. And if UST goes below peg a user can buy UST, burn it for $1 of LUNA and sell it for a profit. While seemingly simple on the surface, this breeds reflexivity that can be very painful in scenarios of extreme volatility.

The primary risk to algorithmic stablecoins is what is referred to as a “death spiral”:



Source: Twitter @ZeMariaMacedo

This either starts with (1) LUNA's price falling enough so that holders of UST fear that their stablecoin isn't solvent, or (2) there is a mass exodus from UST from a decrease in demand.

Once either of these conditions is met, the result is a continuous cycle in which UST falls below peg, newly issued LUNA is needed for redemptions, and LUNA is sold on the market, which causes an even further loss of faith in UST. Given a fall in LUNA's value relative to UST's, each cycle has a greater impact on the dilution of LUNA's supply, and makes negative price impacts even more drastic.

This is very similar to the death spiral in scenarios of convertible bonds, where companies raise money by issuing debt that can be redeemed for shares. If the company is able to increase revenues and drive up the price of their shares, it means they end up with less dilution of shares for their capital. However, if the price of the shares fall, this leads to a death spiral where redemptions cause massive dilutions of supply, which either causes a massive dump in stock prices or single entities with very large control of the company.

On the weekend of May 7, 2021, this scenario began to play out in real time, as the value of all markets pushed LUNA's price low enough to entice fears of insolvency provoking a devastating run on the bank for UST.

Timeline of Events

The UST saga began on Saturday, May 7, when UST's peg from $1 was broken to the downside. Around 10:00 pm UTC it had reached as low as $0.986, before slowly recovering to around $0.995 by Sunday morning UTC.

Source: TradingView FTX UST/USD Pair

Small deviations from $1 are not unheard of, even for the most stable of stablecoins. UST itself fell to just under $0.90 in the May 2021 correction before quickly regaining $1 a few days later. As a result, many UST holders were initially unconcerned by this relatively mild de-peg.

Most of the selling appeared to be coming from Curve Finance on Ethereum in the Wormhole UST / 3CRV pool, and the Binance UST/USDT pair. Liquidity in the Curve pool was lower than usual, as TerraForm Labs withdrew at least $150 million in liquidity from the Wormhole UST / 3CRV pool at around 9:45 pm UTC. This meant selling had a much greater impact on price, and around 10:30 we began to see major UST selling — with $100 million and $85 million coming from singular wallets — as well as other large sales in the multi-millions (1, 2, 3, 4, 5). While some rumors have surfaced about a single entity causing the events, the on-chain data suggests that it was many unique wallets

contributing to the immense sell pressure during the initial decline. Unidentified Ethererum wallets (1, 2) with similar transactions, thought by some to be owned by Jump Capital, were able to buy up close to $400 million in UST to help alleviate the peg within Curve. While the intervention brought some temporary respite, UST was never able to fully regain $1.

Below peg, the LUNA minting incentive kicked in. On May 8th there was new issuance of 924,834 LUNA, approximately 0.3% of the circulating supply, LUNA's price fell from $80 to around $60, a 25% drop.

Source: TradingView Kucoin LUNA/USDT Pair

After regaining some stability, the market began to see large drops on Monday, May 9th, which caused UST to crash even lower, hitting wicks as low as $0.64 on many exchanges before bouncing back to $0.90.

Source: TradingView FTX UST/USD Pair

This, in turn, caused LUNA's supply to increase by over 46 million in under 48 hours, over 10% of the circulating supply. The price then fell to around $30, or over 50% in a single day and around 63% from prices on Saturday.

Source: TradingView Kucoin LUNA/USDT Pair

It was at this point that the Luna Foundation Guard (LFG), a nonprofit organization tasked with providing backstop to UST, began to attempt to restore the peg. LFG held over 80,000 BTC split between 2 wallets, worth around $2.5 billion at the time of the de-pegging. All three wallets (1, 2, 3) were subsequently emptied. At one point 28,200 BTC were returned to the wallet, but even that was emptied within five hours. LFG recently released further data on their use of reserves, confirming that they sold almost the entirety of their BTC, leaving only 313 left for potential initiatives.

In addition, LFG intended to raise $1 billion to $1.5 billion in order to provide additional reinforcement, but was unable to finalize a deal.

With no new funding available Do Kwon, the founder of Terraform Labs, tweeted on Wednesday, May 11, that the only path forward was to absorb all the stablecoin supply that wants to exit. To do so he proposed that the caps on minting LUNA through UST redemption should be raised from around $293 million a day to $1.2 billion, increasing the rate at which LUNA would be able to be printed. However, even before the proposal could pass, as LUNA's price fell exponentially further, so

printed. However, even before the proposal could pass, as LUNA's price fell exponentially further, so too did the increase in LUNA issuance. Consequently, LUNA's supply increased by 40 billion on May 11 and 12, and over 6 trillion on May 13, an insane level of hyperinflation. This obviously had drastic effects on LUNA's price, which fell to as low as fractions of a cent, and prompted many exchanges to delist LUNA from their platform.

Luna Total Supply

UST Death spiral caused exponential increases in LUNA supply chain

Date	Total Supply	Total Supply Change	% Increase
May 7	714,807,488	-416,693	-0.058%
May 8	715,732,352	924,834	0.129%
May 9	718,507,840	2,775,458	0.388%
May 10	764,747,200	46,239,360	6.435%
May 11	2,579,913,728	1,815,166,464	237.4%
May 12	187,584,544,768	185,004,621,824	7171%
May 13	6,907,376,873,285	6,719,792,328,417	3582%

Blockworks Research

Data as of May 13, 2022 | Source: SmartStake Terra Analytics

Source: TradingView Kucoin LUNA/USDT Pair (logarithmic scale)

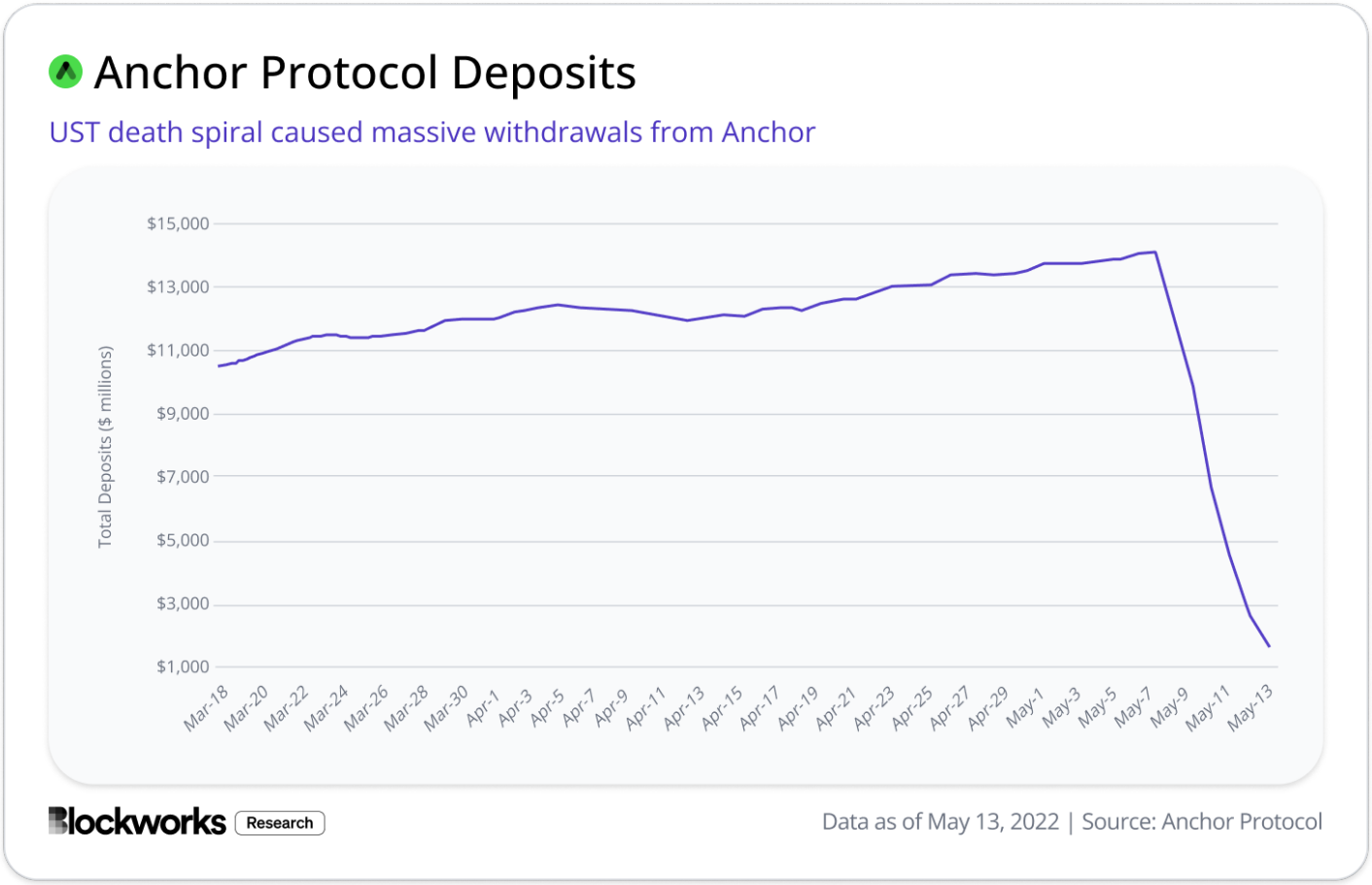
Final Thoughts

One of the largest crashes in crypto to date, it was a classic death spiral scenario sparked by UST trading below peg. As soon as LUNA's price fell far enough, fear of sufficient backing precipitated a rush to the exits. The relentless cycle pushed LUNA's valuation ever closer to zero. As prices of LUNA dropped, the amount of new LUNA issued for UST redemptions skyrocketed, causing further exponential declines.

In hindsight, one of the likely causes for the crash in LUNA and UST was the unsustainable demand for UST to be deposited in Anchor Protocol, which was paying out close to 20% yield on stablecoins, mostly subsidized by a yield reserve. UST was vulnerable to a bank run, or even a Soros attack, where withdrawals, for whatever reason, had the potential to burst the bubble by forcing other rational actors to race for the exits.

Anchor Protocol's $14 billion in deposits had dropped to $2 billion on May 13, an almost 90%

decline in less than a week. This chart illustrates the run, as almost all the capital that accrued chasing the high yield looked for an exit at the same time.



With LUNA's price at extremely low levels, Terra as a layer-1 blockchain is at risk of a majority attack by malicious actors. As of May 15, there is still over $60 million in non-Terra collateral on Anchor, mostly in the form of bonded ETH, so there is an economic incentive for someone to do so. Terraform Labs decided to stake 240 million LUNA in order to defend against such attacks, as well as halt the chain to prevent others from temporarily staking. Wth trillions in supply being minted, however, it's unclear if such measures will be enough.

Though the fate of the current iteration of Terra looks extremely grim, a coalition is being formed in order to find a new home for Terra's builders and community members. There have also been many proposals, including two from Do Kwon, to fork to a brand-new chain, with resources allocated to builders, infrastructure providers, and holders of UST and LUNA at different snapshots, both "pre-attack" and at the launch of the new chain. However, these proposals are not set in stone, and there will be continuous discussions with the community before a final solution is agreed upon. The large, experienced developer community is likely the only value that remains from the Terra ecosystem, and it will be interesting to see what happens to it over the coming months.

Westie

Westie leads coverage on L2s, MakerDAO, Synthetix, and staking. Previously he worked in public sector technology Consulting at Guidehouse.

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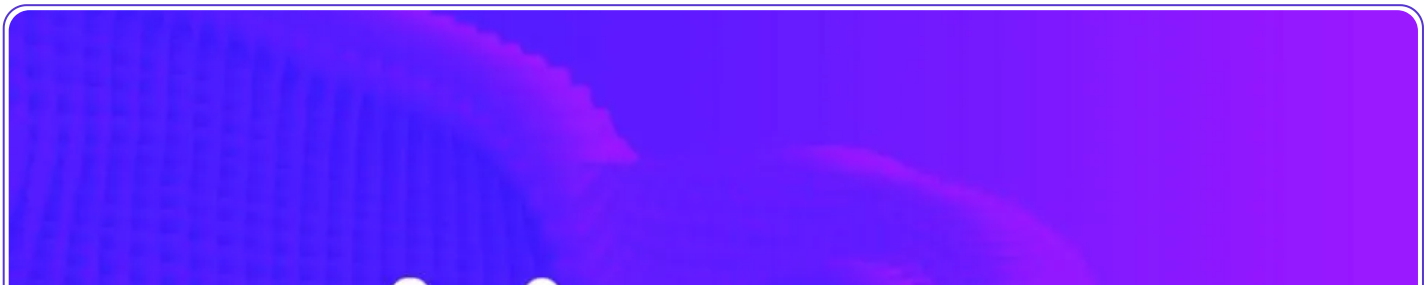

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