

Post Mortem: The death of LUNA & TerraUSD, Explained Simply



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This article will provide you with all the necessary knowledge to understand what happened with LUNA and UST. All you need is the patience to sit through $\approx 1,000$ words. Ready? Set? ...Go!

What is UST?

UST is (was) a stablecoin of the Terra ecosystem. Stablecoins aim to address the volatility of cryptocurrencies and provide a blockchain-native unit of account by pegging their price to some other asset(s) such as the US dollar. At the same time, they maintain most desirable properties of non-stable cryptocurrencies, such as openness and borderless transactions. Cryptocurrencies are deployed atop blockchains, and Terra is the underlying blockchain of UST.

What is Terra?

Terra was created in 2018 with the goal of serving as a platform for attractive decentralized money to combat high inflation and low commercial yields. To do so, it introduced three primary applications: Anchor, the equivalent of a blockchain bank paying interest on deposits, Mirror, an on-chain derivatives protocol for investing, and Chai, a mobile payments app promising low fees, cashback, and fast settlement. Many other applications were built on top of Terra, creating an ecosystem that collected \$31 billion in total value locked (TVL). Think of TVL as a measure of how valuable a network is. TVL is essentially “assets under management” but for DeFi.



Critical to this ecosystem's growth, was Terra's stablecoin, UST, which was used as a trading pair, store of value, and medium of exchange. Demand for UST grew from its utility in the Terra ecosystem, the need for stability in volatile markets, and yields that could reach 20% when it was provided to DeFi protocols (mainly Anchor). To understand the appeal of this narrative, consider that the average APY for savings accounts is 0.06% and 2.8% for a 10-year T-bond. On top of that international remittances are costly and take days to clear. Put simply, UST (and stablecoins in general) presents an attractive alternative to fiat because of their borderless nature, higher yields and, as an added bonus for crypto-natives, more efficient (easier, cheaper, faster) exchangeability for crypto.

However, there is no such thing as a free lunch in finance. Higher yields denote higher assumed risk, which in the case of UST was justified.

How does UST work (primer on algorithmic stablecoins)?

As an algorithmic stablecoin, UST achieved its peg to the USD through arbitrage. This approach is unlike some other popular stablecoins that utilise collaterals and are 1:1 redeemable for the asset they represent. In theory, algorithmic stablecoins

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However, those benefits come at the expense of stability. To maintain stability against the USD, UST has a “partner” cryptocurrency called LUNA. LUNA is not a stablecoin and its price can fluctuate freely subject to market supply and demand. Importantly, 1 UST can always be redeemed for \$1 worth of LUNA (minus a small fee) and vice versa. In practice during the redemption process, some portion of LUNA is destroyed while the rest is locked in a treasury, effectively removing it from circulation. On the contrary, new UST is created. Luna can be created by removing UST from circulation. This fluctuation in supply is critical to the stability of UST.

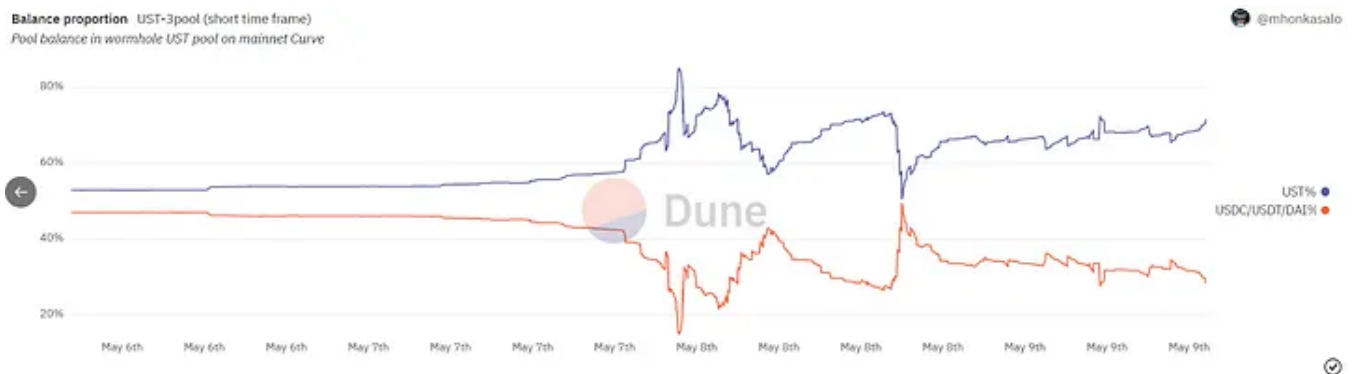
When 1 UST = 1 USD, there is no incentive to switch LUNA for UST or vice versa. However, this changes when UST’s price deviates from the desirable peg. If for instance, UST trades at \$0.98 arbitrageurs can benefit from the price discrepancy by buying it and redeeming it for \$1 worth of LUNA, pocketing the \$0.02 difference. As a result, the price of UST increases because of the increased demand, as well as the contraction of its supply since LUNA can only be created by destroying UST. As a result of this process, the price of LUNA falls.

Conversely, if UST trades above peg, let’s say at \$1.02, arbitrageurs are incentivised to swap (and remove from circulation) \$1 worth of LUNA for (new) UST, netting \$0.02 in profit. The increased supply of UST and selling pressure from arbitrageurs “cashing out” to other assets as they expect others to do the same brings the market price of UST down. In the process, the price of LUNA rises. This mechanism makes LUNA more desirable the higher the utility of, and demand for UST. LUNA is essentially a bet on the utility of UST, and the success of the Terra ecosystem.

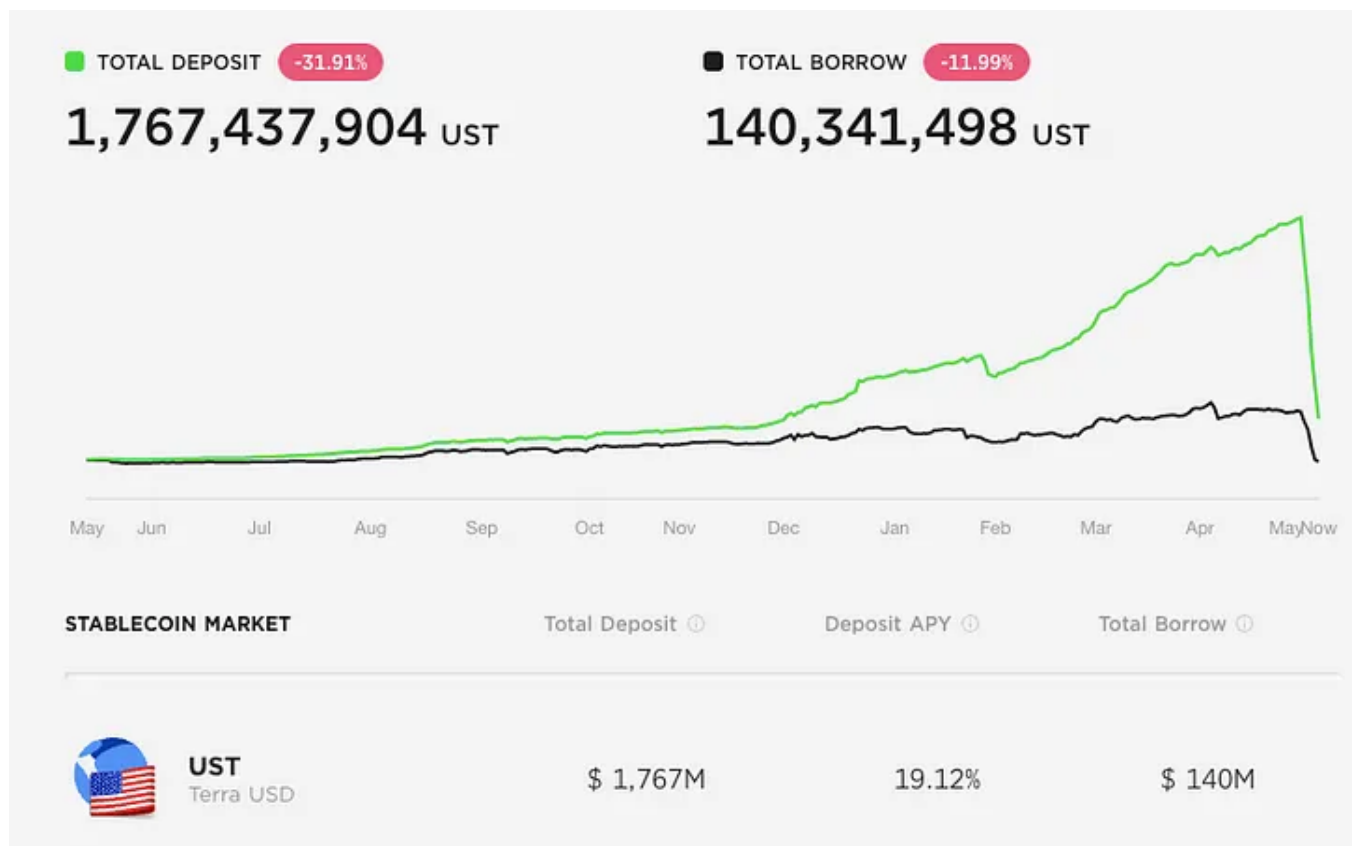
Overall this mechanism is designed to even out supply and demand, balancing the price of UST to that of the dollar, but only works if traders want LUNA.

So what went wrong?

A few things at the same time. Over the weekend, UST started trading slightly below its peg, something that could be attributed to the subpar macro environment in crypto and in general. This price discrepancy led to the progressive emptying of Curve's reserves of UST (some claim it was a coordinated attack), as traders switched their UST for other stablecoins, crypto, or fiat. Curve is the premier decentralized exchange of stablecoins, as such, the removal of mass liquidity sent a negative signal to the markets and worsened the price of UST, which receded even more from its peg of \$1.



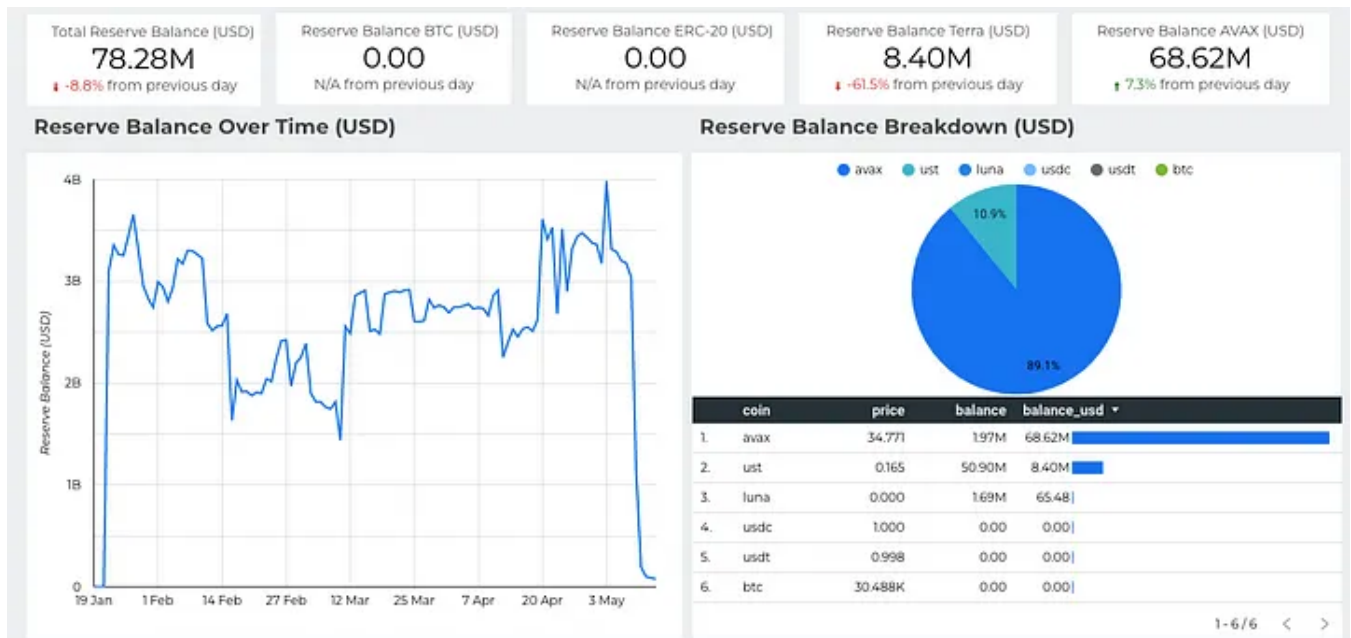
Remember the aforementioned crypto bank “Anchor” that provided 20% yield on UST? Uncertainty over UST’s ability to maintain its peg led to a mass exodus with more than 10 billion UST removed from the protocol and sold in the market. As trust was diminishing in UST and the overall Terra ecosystem, LUNA also became an unattractive asset, since, as we established, it is essentially a bet on the success of UST and Terra. This resulted in traders short selling LUNA, further decreasing its price.



If UST falls below peg, its ability to regain parity with the USD depends on LUNA retaining some reasonable value, that is because, as we established, 1 UST will be burned (removed from circulation) for \$1 worth of newly created LUNA. While this mechanism works fine on a good day, it breaks under extreme pressure as the massive exchange of UST for LUNA, results in the devaluing of LUNA as its supply expands. The more UST deviates from its peg, the more arbitrageurs burn it for LUNA, the more LUNA gets devalued. The mass sell-off of UST in the open market also means that UST does not regain its peg, leading to a death spiral.

How did this affect the wider market?

The Luna Foundation Guard (LFG), is the entity behind Terra and UST, tasked with defending the UST peg to USD. As part of its reserves, it held (predominately) Bitcoin, which it incrementally sold to prop up the price of UST. As BTC sold from LFG flooded the market, each additional BTC sold for a lower price, making the rescue of UST harder. Ultimately, LFG drained its BTC reserves over the span of a few days, yet it was unsuccessful at defending the UST peg.



What happens now?

Validators halted the Terra blockchain in search of a solution. This is a blow to the network's open and resilient facade. Terra can opt to abandon UST entirely, in an attempt to rescue some of the value of LUNA or abandon both UST and LUNA in favour of a new token. This might also be the end of the Terra ecosystem as a whole.

