

L39: Case Study - Terra/Luna Collapse

Module E: DeFi Ecosystem

Blockchain & Cryptocurrency

December 2025

- Understand the Terra/Luna mechanism (UST stablecoin + LUNA token)
- Analyze the Anchor Protocol's 20% APY promise
- Trace the death spiral timeline (May 2022)
- Identify systemic risks and warning signs
- Extract lessons for DeFi stability and sustainability

Key Components:

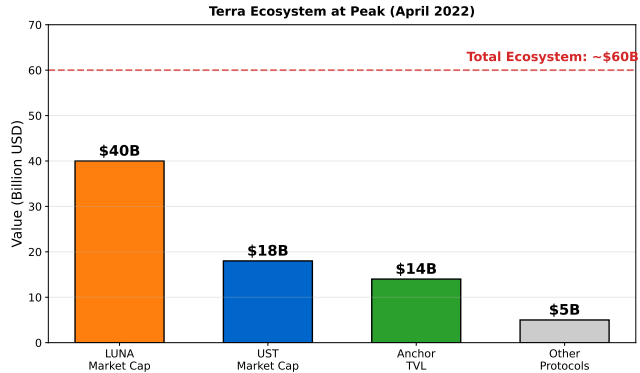
- **UST (TerraUSD):** Algorithmic stablecoin pegged to \$1
- **LUNA:** Native token of Terra blockchain, used to stabilize UST
- **Anchor Protocol:** Lending platform offering 20% APY on UST deposits

Creator: Do Kwon (Terraform Labs)

Peak Market Cap (April 2022): UST: \$18B, LUNA: \$40B

Collapse (May 2022): Both went to near-zero in 72 hours.

Terra Ecosystem at Peak



Combined \$60B ecosystem collapsed in just 72 hours in May 2022

The UST-LUNA Mechanism

Algorithmic Stability: UST maintains \$1 peg through arbitrage with LUNA.

Mechanism:

- ① **Mint UST:** Burn \$1 of LUNA, mint 1 UST
- ② **Burn UST:** Burn 1 UST, mint \$1 of LUNA

If UST > \$1: Burn LUNA → mint UST → sell UST → profit

If UST < \$1: Buy UST → burn UST → mint LUNA → profit

Problem: Only works if LUNA maintains value!

The Fatal Flaw: Death Spiral

Death Spiral Logic:

- 1 UST depegs below \$1 (e.g., \$0.90)
- 2 Arbitrageurs burn UST, mint LUNA
- 3 Massive LUNA supply increase (dilution)
- 4 LUNA price crashes
- 5 Confidence in UST collapses
- 6 More UST selling, deeper depeg
- 7 Cycle repeats, accelerating downward

Analogy: Like a central bank defending currency by printing more currency.

Critical Insight: Pure algorithmic stablecoins have no demand floor.

Anchor Protocol: The 20% APY Trap

Promise: Earn 20% APY by depositing UST.

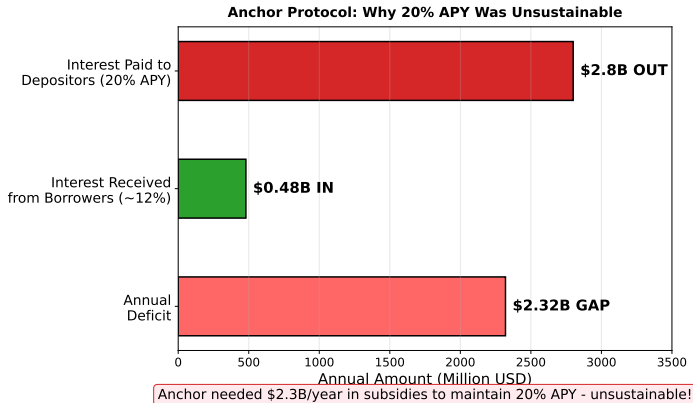
How It Worked:

- Users deposit UST into Anchor
- Anchor lends UST to borrowers (collateralized by staked LUNA)
- Borrowers pay interest (10-15%)
- **Gap:** Anchor subsidized difference to reach 20%

Red Flags:

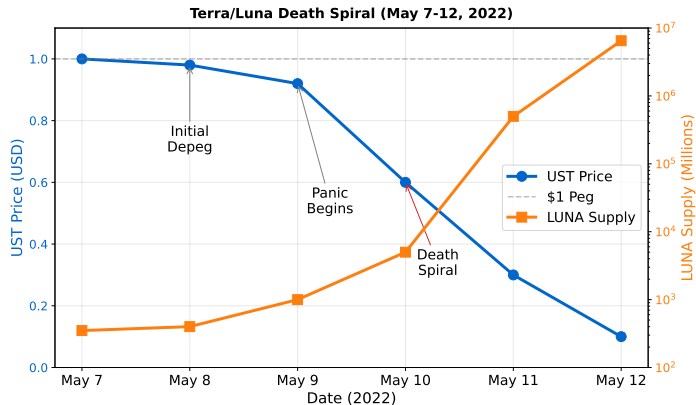
- Yield reserve burning \$50-100M per month
- Projected to run out by mid-2022

Why 20% APY Was Unsustainable



Anchor was a Ponzi-like scheme: new deposits paid old depositors

The Death Spiral (May 7-12, 2022)



As UST depegged, LUNA supply exploded from 350M to 6.5 trillion tokens

May 7-8: Initial Depeg

- Large UST withdrawals from Anchor (\$2B+ in 48 hours)
- UST briefly drops to \$0.98

May 9: Panic Begins

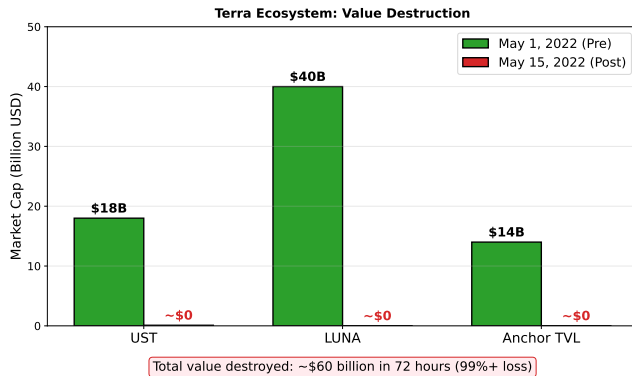
- UST falls to \$0.92, LUNA drops 30%

May 10: Death Spiral Accelerates

- UST at \$0.60, LUNA collapses from \$60 to \$1

May 11-12: Total Collapse

- UST at \$0.01, LUNA at \$0.0001
- Terra blockchain halted



Estimated \$40B+ in investor losses; triggered broader crypto contagion

Luna Foundation Guard (LFG):

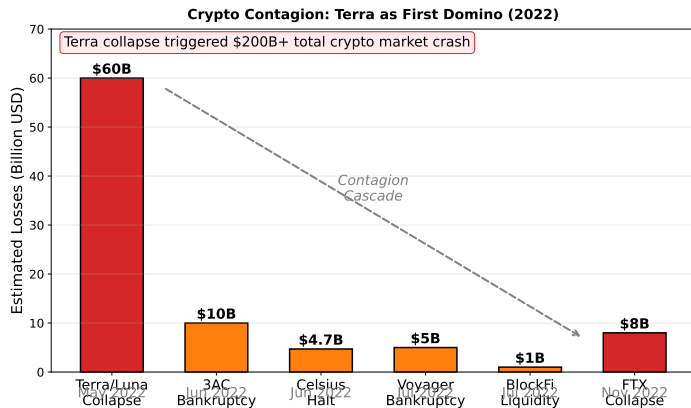
- Reserve fund with \$3B+ in Bitcoin, AVAX
- Plan: If UST depegs, sell BTC to buy UST

Reality (May 2022):

- LFG deployed \$1.5B BTC to buy UST
- Ineffective: Death spiral too fast
- Lost most of the BTC (sold near bottom)

Lesson: Finite reserves cannot defend algorithmic peg under mass panic.

Contagion: First Domino



Terra collapse caused 3AC bankruptcy, which triggered Celsius/Voyager failures

Three Arrows Capital (3AC) Contagion

Connection:

- 3AC was major LUNA investor (billions in exposure)

Cascade:

- 1 LUNA collapses (May 2022)
- 2 3AC's collateral becomes worthless
- 3 3AC fails margin calls on other loans
- 4 Lenders (BlockFi, Celsius, Voyager) take massive losses
- 5 3AC declares bankruptcy (July 2022)

Lesson: Interconnected leverage amplifies failures.

Quotes (Pre-Collapse):

- "I don't debate the poor." (Twitter, responding to critics)
- "95% of stablecoins will fail, UST will win."

Behavior:

- Dismissed warnings from economists, DeFi experts
- Promised unrealistic yields (20% Anchor)

Legal Aftermath:

- SEC charged Do Kwon with fraud (2023)
- Arrested in Montenegro (March 2023)
- Facing extradition to US or South Korea

Red Flags That Were Ignored:

- ❶ **Unsustainable Yield:** 20% APY with no underlying revenue
- ❷ **Algorithmic Design Flaw:** No collateral, death spiral risk
- ❸ **Concentration Risk:** 78% of UST locked in Anchor
- ❹ **Hubris:** Founder ignored criticism, attacked skeptics
- ❺ **Rapid Growth:** UST grew from \$2B to \$18B in 6 months
- ❻ **Lack of Stress Testing:** No proven resilience

For Investors:

- Beware of unsustainable yields ($\geq 10\%$ on stablecoins)
- Algorithmic stablecoins are experimental and risky
- Hubris and dismissiveness are red flags

For Protocols:

- Overcollateralization is necessary for stability
- Stress test designs under extreme scenarios

For Regulators:

- Algorithmic stablecoins pose systemic risk
- Consider reserve requirements for stablecoins

Why did DAI survive while UST collapsed?

UST (Failed)

- No collateral
- Pure algorithm
- Death spiral possible
- Unsustainable yield

DAI (Survived)

- 150%+ overcollateralized
- Backed by ETH, USDC
- Liquidations prevent spiral
- No unrealistic yields

Key Difference: Collateral provides demand floor.

Conclusion: Overcollateralization is inefficient but necessary.

Post-Collapse Plan (May 2022):

- Abandon UST stablecoin
- Relaunch Terra blockchain as “Terra 2.0”
- Airdrop to UST/LUNA holders

Result:

- Terra 2.0 launched with minimal adoption
- New LUNA price: \$6 → \$0.50 (within months)
- Community fractured, trust destroyed

Lesson: Trust, once broken, is nearly impossible to rebuild.

US Response:

- SEC charged Do Kwon with fraud
- Proposed legislation requiring reserve backing

Global Response:

- South Korea: Investigation into Terraform Labs
- EU MiCA: Included stablecoin reserve requirements

Industry Impact:

- Algorithmic stablecoins largely abandoned
- FRAX increased collateral ratio to 100%
- Focus shifted to fiat-backed and overcollateralized models

Why Did People Believe?

- 1 **Greed:** 20% APY too attractive to pass up
- 2 **FOMO:** Fear of missing “next big thing”
- 3 **Herd Mentality:** Everyone else was buying
- 4 **Confirmation Bias:** Only listened to bulls
- 5 **Complexity:** Most users didn’t understand the mechanism
- 6 **Charismatic Leader:** Do Kwon’s confidence was persuasive

Lesson: If it sounds too good to be true, it probably is.

Key Takeaways:

- Terra/Luna was \$60B algorithmic stablecoin experiment that collapsed in May 2022
- UST-LUNA mechanism relied on arbitrage but had no collateral backing
- Anchor's 20% APY was unsustainable Ponzi-like scheme
- Death spiral: UST depeg → LUNA hyperinflation → total collapse
- \$40B+ value destroyed, triggering broader crypto contagion
- Lessons: Beware unsustainable yields, algorithmic stablecoins need collateral

Next Lecture: Lab - Testnet Lending (hands-on with Aave).

- ❶ What structural difference between DAI and UST prevented DAI from collapsing?
- ❷ Could the Bitcoin reserve have saved UST if it were larger (e.g., \$20B)?
- ❸ Why did Anchor's 20% APY attract deposits despite being unsustainable?
- ❹ How could regulators have prevented Terra collapse without banning innovation?
- ❺ Would you invest in a new algorithmic stablecoin if it had better design?