# Stablecoin Risk Assessment Framework (SRAF)

## Assessing stablecoin risks from different dimensions

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# Introduction

**About me**

- Blockchain analytics at crypto exchange
- Banking (credit risk modeller, developer)

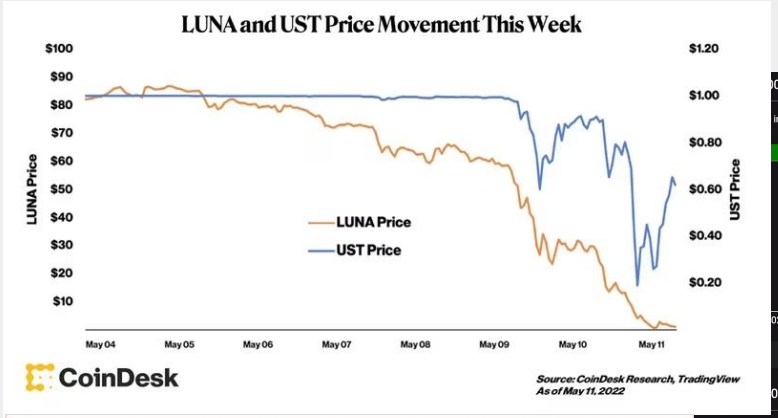
**Other research**

- Oracle counterpoint: Relationship between On-chain and Off-chain Market data

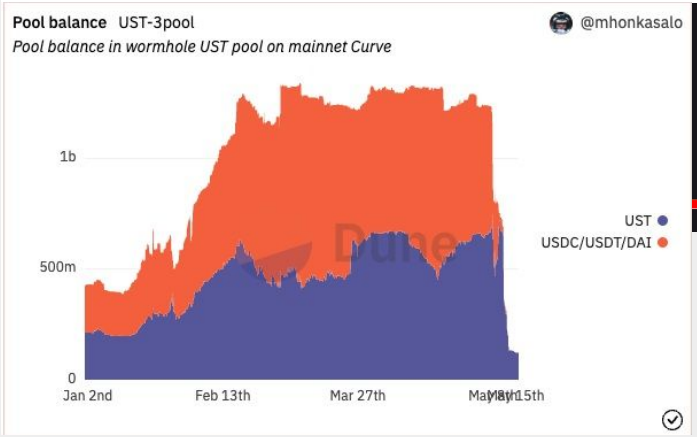
**About this project**

- Personal project independent from my current employer
- Grant from Ethereum Foundation
- Will be completely open-sourced

# The Fall of Terra







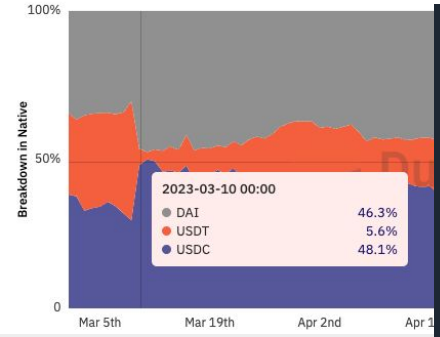

**2022, May 07**

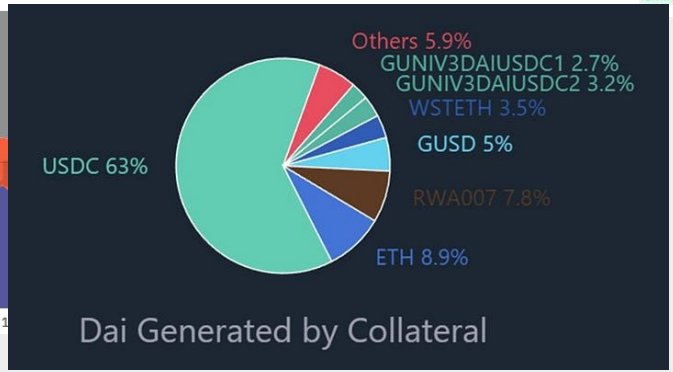
- $UST slightly depegged to $0.985, possibly triggered by large amount of liquidity and deposit were removed from Curve and Anchor
- LFG tried to recover peg by selling BTC. However, UST cannot recover as expected, market's concern turn into panic
- More $UST holders try to exit:
  - By selling $UST to UST-3crv pool
  - By burning $UST for LUNA

**May 12**

- $UST and Luna went into death spiral

# The Silicon Valley Bank Collapse


**2022, Mar 10**

- Part of USDC's cash reserve stuck at SVB after it was shut by US regulator
- USDC depeg, followed by some other stablecoins
- 1:1 USDC<->DAI => DAI depeg with USDC
- A run on MakerDao's PSM, GUSD and USDP reserves were drained
- USDC were flushed into the Curve tripool (DAI/USDC/USDT)
- On Monday, FDIC promised withdrawals would be enabled for all deposits at SVB

**Mar 12**

- $USDC back to $1

# General concerns arise from holding stablecoins

1. The risk the stablecoin significantly depegs
    - Value of the stablecoin may go back to peg
    - Stablecoin holder may take a haircut

2. The risk the entire stablecoin project collapses
    - Value of the stablecoin cannot be recovered.

3. The risk of users being censored from using the stablecoin
    - Value is there but users cannot use stablecoins anymore

# Current

**Metrics that are most easily accessible:**

- Market capitalisations
- Circulating supply

**Metrics that are not as easily accessible:**

- Historical price volatilities
- Value of collateral
- Liquidity
- Incentive to hold

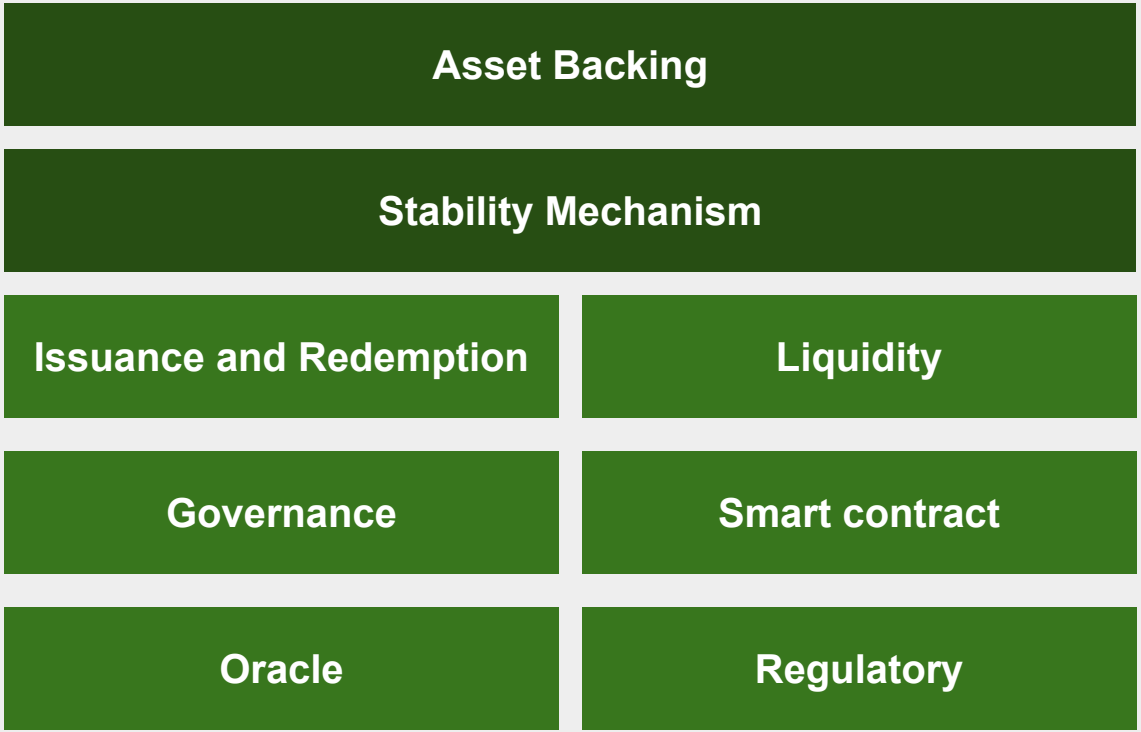
Even the combination of all of these are not enough for analysing stablecoin risks

# SRAF’s Goals

Build a multi-dimensional stablecoin risk assessment framework

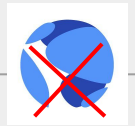
- Measure stablecoin risks from different angles
- Easy for common users to access information
- Encourage more risk-driven decisions

# Risk Assessment Categories



# Asset Backing

The risk that the total value of the assets selected to back the stablecoin drop below the pegged value

| Exogenous | Endogenous | No backing |
| --- | --- | --- |
| Assets that have value independent of the stablecoin project. E.g. ETH, BTC, fiats, other stablecoins | Assets whose value arises (circularly) from the stablecoin system itself. Like ‘equity’ in the system | Systems with no explicit backing that try to rely on reward mechanisms to dynamically adjust supply/stabilize price |
|   |    |   |

# Exogenous Asset Backing

# Asset backing Assessment Example

| | Type | Asset Type | Asset Breakdown | Validation of RWA | Asset location | Information Quality |
|---|---|---|---|---|---|---|
| **USDC** | Custodial | Exogenous | 85% short US treasuries, 15% cash at US banks | Monthly attestation and annual audit | US Banks | Medium |
| **USDT** | Custocial | Exogenous | 64% US Tbills, 10% reverse repos, 10% MMFs, 8% bank deposits,, mix of corporate bonds, funds, metals, secured loans, digital tokens | Quarterly attestation | Unknown, maybe Bahama banks | Low |
| **DAI** | Non-Custodial | Exogenous | 43% RWA, 15% USDC, 5% GUSD,<br>remainder overcollateralized (mostly ETH and wstETH) | TBC | On-chain and off-chain (RWAs) | High for on-chain, ? for off-chain |

# Stability Mechanism: combo of backing and mechanism

| | **Reserve Component (exchange 1:1ish)** | **Leverage Component** |
|---|---|---|
| **USDC / USDT** | Reserve backed, centralised stablecoin with custodian | - |
| **DAI** | 66% backed by 1:1 USDC/GUSD/USDP vs DAI at PSM and RWA | 34% backed by >100% collateral at MCD |
| **crvUSD** | PegKeeper backed by other stablecoins | Backed by >100% collateral in LLAMMA |
| **LUSD** | - | Backed by >100% ETH collateral at Trove |
| **UST** | 10% BTC, rest endogenous LUNA | - |

Counterparty, censorship, regulatory risks

Something could happen to reserve assets
- Lead to under-reserved
- then have UST-like risks if maintain 1:1 exchange

W/o PSM or negative rates, suffers from short squeezes (deleveraging spirals) like original DAI design

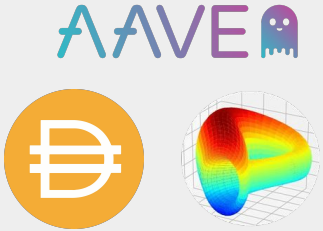
Under-reserved -> susceptible to runs and collapse

# Governance

- Who owns the governance process?
- How fast is the decision turn-over?
- Level of decentralisation and transparency
- What safeguards are there against bad governance?

**Trusted**

**Majority Vote**



**Algorithm**

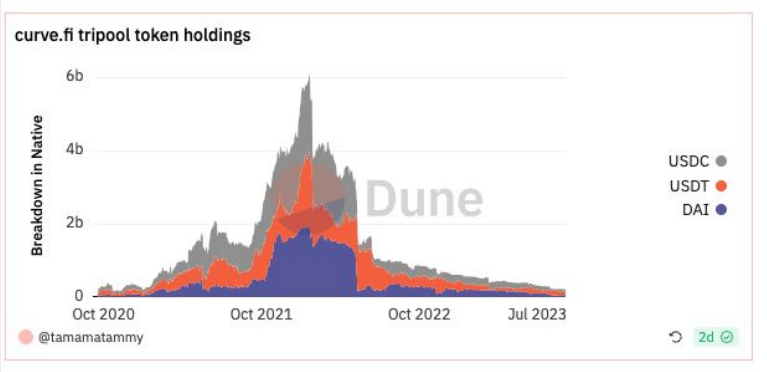
# Liquidity

Off-chain liquidity:

- Liquidity at centralised exchanges and off-chain mint/redeem
- Cannot be accurately assessed without knowing all CEX's addresses

On-chain liquidity

- Liquidity at decentralised exchanges
- Can be monitored by assessing token balances and market depth at key DEX pools




# Other categories

| | | |
|---|---|---|
| Issuance and redemption | Determines the stablecoin supply | - Whether KYC is required,<br>- Who controls the issuance process,<br>- Where does the issuance happen - e.g. Circle business account and Coinbase for USDC, on-chain for DAI,etc<br>- Size of the issuance amount,<br>- Size of the issuance fee, |
| Smart contract | Programming bug or logical error in smart contract | - Code complexity, Whether it's audited, last exploit, etc |
| Oracle | Risk of incorrect off-chain information being imported | - Oracle types, providers, and design |
| Regulation | Risk of changes in laws and regulation that may lead to negative impact to the stablecoin | - Geographical location, regulatory status, regulatory transparency |

# Past stablecoin failures

**Project failure**

- UST/Luna (endogenous collateral)
- IRON/Titan (endogenous collateral)
- Basis cash (unbacked)
- NuBits (unbacked)
- Empty Set Dollar (unbacked)

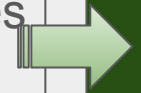
**Temporary depeg**

- USDC depeg due to SVB collapse (custodian risk)
- DAI depeg  (deleveraging spiral 2020, Reserve overly rely on USDC 2023 )

# The challenges and more

How to assign an overall rating to stablecoin?

- How to weight different categories of risk? Depends on the user's objective
- Not enough data to measure probabilities of stablecoin defaults, so hard to assign score based on this



Our approach:

- Risk score for each risk category, user decides the importance of each category based on their own objective and risk appetite

# Potential Applications

- Help users decide which stablecoins they want to use based on the risks they are most worried about
- Help protocols decide which stablecoins to incorporate as collateral based on risks the protocol should/shouldn't take on
- Improve stablecoin information quality for regulators: not everything is UST!

Many new stablecoins innovating on mechanisms, but also fit into framework. Examples:

- **crvUSD**: innovation on leverage mechanism (LLAMMA)
- **Gyroscope**: innovation on reserve mechanism risk control and automating monetary policy

# More coming soon

- A paper to provide an overview of the SRAF framework, including detailed description of the chosen risk categories, risk factors and the metrics we used to measure them
- Key stablecoin project overview
- A Dune Dashboard to show live analytics that are used to monitor latest stablecoin market movement and on-chain activities (e.g. price volatilities, market cap, etc)

Follow me on Twitter (@tamamatammy) for updates!