Stablecoin Risk Assessment Framework (SRAF)

Assessing stablecoin risks from different dimensions

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Dappcon Berlin September 2023

Introduction

About me

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

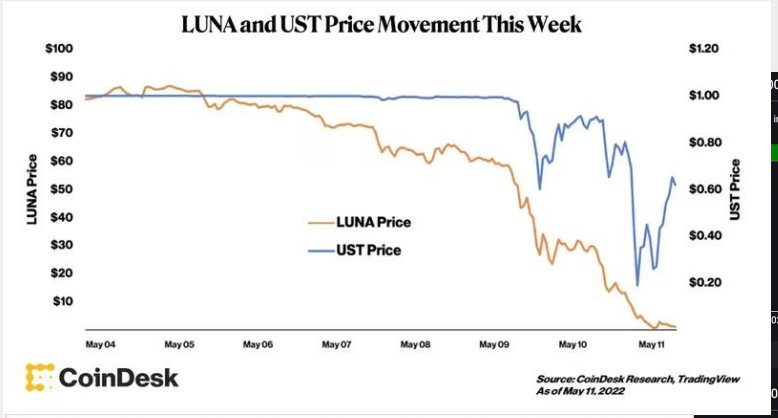
Other research

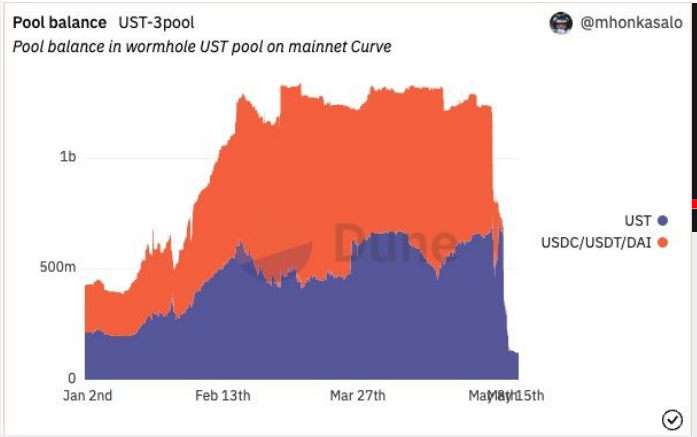
- Oracle counterpoint: Relationship between On-chain and Off-chain Market data

About this project

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

The Fall of Terra





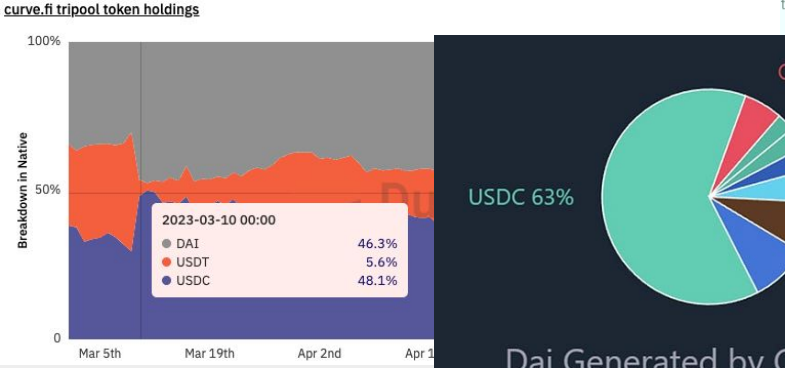
2022, May 07

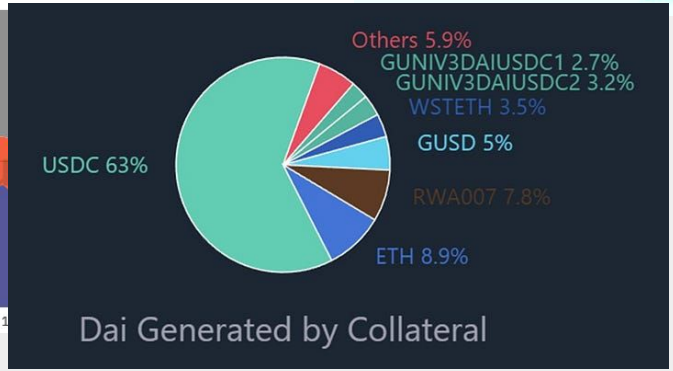
- $UST slightly depegged to $0.985, possibly triggered by large amount of liquidity and deposit were removed from Curve and Anchor
- LFG tried to recover peg by selling BTC. However, UST cannot recover as expected, market's concern turn into panic
- More $UST holders try to exit:
  - By selling $UST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

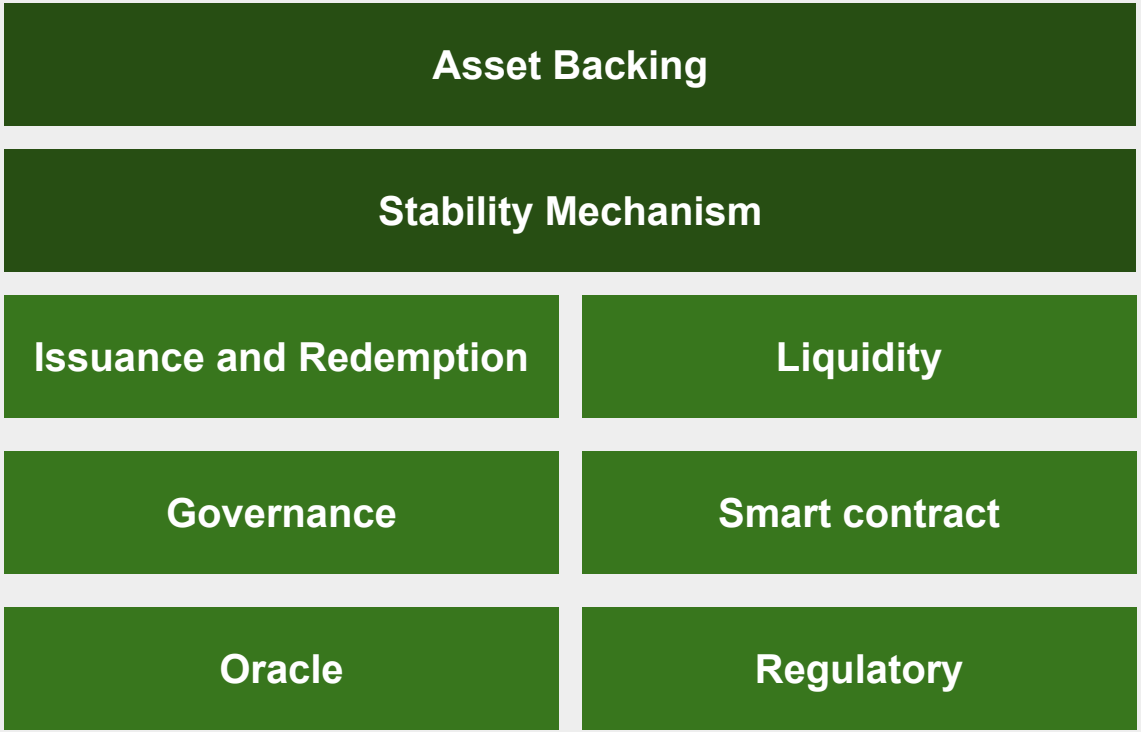
Even the combination of all of these are not enough for analysing stablecoin risks

SRAF’s Goals

Build a multi-dimensional stablecoin risk assessment framework

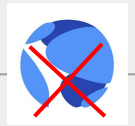
- Measure stablecoin risks from different angles
- Easy for common users to access information
- Encourage more risk-driven decisions

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, 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

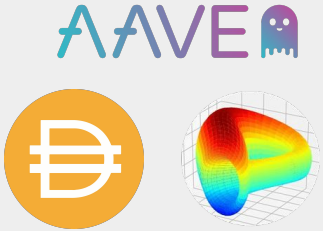
Under-reserved -> susceptible to runs and collapse

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

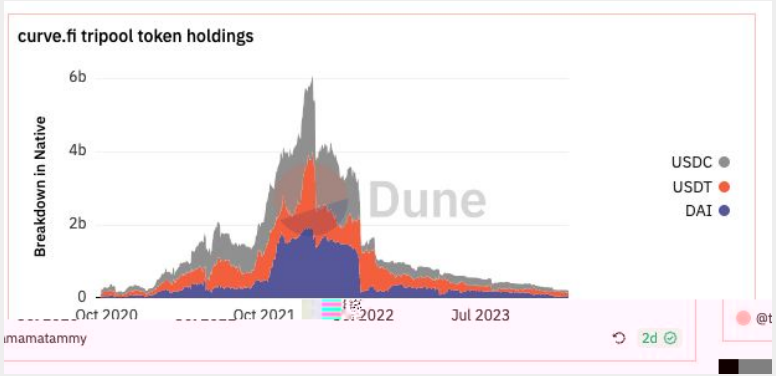
Liquidity

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, - Who controls the issuance process, - Where does the issuance happen - e.g. Circle business account and Coinbase for USDC, on-chain for DAI,etc - Size of the issuance amount, - 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)

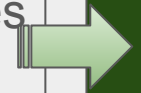
Temporary depeg

- 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!