Stablecoin Safety Assessment

Coin	FRAX
Date	04-06-2023
Overall Grade	D

Factor Scores:

S. No	Factor	Score	Assessment
1	Stability	0.82	Stable
2	Management	1.00	Very low risk
3	Implementation	N/A	Not assessed
4	Decentralization	0.38	Moderate risk
5	Governance	0.00	High risk
6	Externals	N/A	Not assessed

Summary

- FRAX has one of the tightest pegs relative to its peers. It has performed well historically, especially during times of broader market stress. However, it is partially collateralized by the protocol's native FXS token, which makes it prone to bank-run risks, but with limited loss potential.
- The Frax protocol is led by a public team of seasoned entrepreneurs/programmers based in the United States.
- Although FRAX aims to be a decentralized stablecoin,
    - It is heavily reliant on centralized assets such as USDC, USDT and DAI
    - The core team controls a majority of the voting power (>51%) and also has complete control over FRAX's monetary policy and the protocol's assets.
- In our assessment, FRAX is neither suitable for the average retail stablecoin holder nor for the decentralization-focused holders. It is more suited to risk-seeking yield farmers and liquidity providers who understand the complexities and nuances of the protocol and have appropriate risk management systems in place.

Evaluation

1. Stability [Score 0.82]

1.1. Reserves [Score 0.87]

1.1.1. Collateralization % and Type of Collateral [Score 0.94]

Frax's reserves comprise Curve and Uniswap v3 LP tokens (~79%), USDC (~3%), non-native cryptocurrencies (~12%) and FXS (~6%). Frax can redeem the LP tokens for underlying pool assets.

Unlike most stablecoin issuers, Frax deploys most collateral assets in liquidity pools to generate yield, instead of keeping them idle for future redemptions. By concentrating most of its liquidity on Curve pools, the protocol can ensure that FRAX's peg is strictly maintained for a prolonged period, despite under-collateralization. This works most of the times but is not failure-proof. If FRAX were to experience a bank-run like event, the following would occur:

- FRAX holders deposit their FRAX in liquidity pools and swap out other paired stablecoins, causing a severe pool imbalance. Consequently, Curve pools increase slippage, eventually breaking 1:1 swaps. Soon, FRAX starts trading outside the protocol's target price band 0.9933~1.0033.
- When FRAX trades below 0.9933, the protocol's direct redemption mechanism kicks in. FRAX holders may now redeem FRAX through the Frax App and receive a combination of USDC and FXS (based on the Collateral Ratio).
- FXS issued against FRAX redemption gets sold in the market. This selling pressure drives down the price of FXS rapidly. In turn, the protocol would need to issue exponentially more FXS for subsequent FRAX redemptions as price continues to spiral down.
- Eventually, the protocol runs out of USDC to carry on redemptions and / or FXS's price crashes to $0. In both cases, the protocol incurs significant bad debt due to under-collateralization.

For these reasons, we treat endogenous collateral such as FXS as worthless for determining the protocol's ability to wind down safely.

Frax's Collateral Ratio

As per FRAX

Stable collateral = $228.7M

Crypto collateral = $43M

Total collateral = $271.7M

Outstanding FRAX = $288.8M

Collateral Ratio = 94%

FRAX is under-collateralized because it uses a partial seigniorage shares model.

As per Bluechip

(A) Stable collateral = $228.7M

Crypto collateral = $43M

(B) Adjusted value of crypto collateral for 220% Collateralization Ratio = $17.48M

(Note: 15% discount applied to all non-ETH/non-BTC crypto)

(C) Third-party liquidity locked in LPs for more than 1 year = $51M

(TVL of Locked Liquidity / 2, assuming balanced pools for simplicity)

(D) Adjusted Total Collateral (A) + (B) + (C) = $297.2M

(E) Outstanding FRAX = $288.8M

Adjusted Collateral Ratio (D)/(E) = 103%

Stablecoin liquidity locked by third-party investors is functionally the same as Frax-owned liquidity. If locked stable liquidity exceeds the algorithmic value of FRAX (represented by FXS), FRAX can be considered fully collateralized.

That said, locked liquidity is only a temporary solution to FRAX's under-collateralization problem. In our view, FRAX's semi-algorithmic model is fragile to redemption shocks or panic-induced bank runs.

1.1.2. Storage of Assets [**Score 0.67**]

~84% of Frax's reserves are held in third-party smart contracts (Curve and Uniswap v3) and the remaining assets are in team-controlled Multisigs (13%) and the protocol's own smart contracts (3%). Users are advised to note that the use of third-party smart contracts can expose Frax to significant risks. For example, during the Rari Capital exploit in April 2022, Frax suffered a loss of ~$13M as a result of its attempts to generate yield using its reserves.

1.1.3. Asset Segregation [**Score 1.00**]

Frax segregates its treasury assets from protocol-owned assets earmarked for backing FRAX's peg.

1.2. Market Feedback [Score 0.50]

1.2.1. Frequency of Deviation Below Peg [Score 0.50]

Number of Days where VWAP < Peg by 0.5% or more during the past 180 days = 2

1.2.2. Max Deviation Below Peg [Score 0.00]

Biggest daily VWAP deviation below peg: 3.55%

1.2.3. Volatility (% per day) [Score 0.75]

Daily volatility (%) over the past 180-day period: 0.43%

1.2.4. Downside Volatility in a Market Downturn [Score 1.00]

Average deviation below peg during the 5 worst-performing days for BTC (DoD price change) in a 180-day period: 0.007%

1.2.5. Liquidity Pool Imbalance [Score 0.25]

Pool 1 - FRAXBP (FRAX/USDC)

- FRAX Share of Pool - 64%
- Pool Type - 2 Token
- Optimal Share of FRAX - 50%
- Deviation from Optimal Share - 28%
- Non-FRAX TVL in the pool - $152,257,857
- Pool Score - 0.25

Pool 2 - FRAX METAPOOL (FRAX/3CRV)

- FRAX Share of Pool - 66%
- Pool Type - 2 Token
- Optimal Share of FRAX - 50%
- Deviation from Optimal Share - 33%
- Non-FRAX TVL in the pool - $87,735,903
- Pool Score - 0.25

TVL-weighted Liquidity Pool score - 0.25

1.3. Stability Mechanism [Score 0.0.96]

1.3.1. Core Mechanism [Score 0.92]

- In FRAX's v1, peg stability was based on arbitrage - allowing arbitrageurs to freely mint and redeem FRAX with USDC (and partly FXS) as collateral. In the protocol's current iteration, minting and redemptions are restricted only to scenarios wherein FRAX is trading outside the $0.9933~$1.0033 price band. In all other scenarios, users wishing to acquire or sell FRAX may do so through Frax-controlled stablecoin-only liquidity pools. Frax-controlled liquidity pools are AMM

pools (primarily on Curve DEX) deployed by Frax using the collateral acquired through the minting of FRAX. This is known as Protocol Owned Liquidity since Frax now owns the LP tokens representing its share of the pool. The 2 main liquidity pools are FRAX+3Crv and FRAX+USDC on Curve Finance. These pools are also open to other liquidity providers and Frax encourages participants through various token incentives.

- Switching the core mechanism from arbitrage to swaps on liquidity pools has made a noteworthy improvement in Frax's peg stability. It is worth mentioning that this is more attributable to Curve's stableswap mechanism which allows near-perfect 1:1 swaps, rather than to the market's increase in confidence in FRAX. As an added benefit, Frax now puts its collateral to use and generates fees on swaps made in its pools. However, this introduces contamination risk to the system. Frax's 2nd biggest LP is the FRAX+3Crv pool which includes FRAX, DAI, USDT, and USDC. Hypothetically, if the market were to lose confidence in USDT, holders of those coins would swap out their USDT for DAI and USDC 1:1 from the pool, leaving Frax and, indirectly, the holders of FRAX, to own the least valuable coin.
- As a matter of prudence, Frax maintains a small portion of its reserves (<5%) in USDC. If FRAX were to trade outside the $0.9933~$1.0033 price band on Curve, FRAX holders, to the extent of USDC balance available, may directly redeem FRAX for USDC and FXS on Frax's website.

1.3.2. Primary Liquidity Access [Score 1.00]

FRAX offers primary liquidity through protocol owned liquidity pools. FRAX can be swapped for USDT, DAI or USDC.

2. Management [Score 0.84]

2.1. Restrictions [Score 0.84]

2.1.1. Known Core Teams [Score 1.00]

The co-founders Sam Kazemian, Travis Moore and Jason Huan.

2.1.2. Jurisdiction Score [Score 0.68]

While Frax Finance is registered in Grand Cayman*, at least 2 of the 3 co-founders are based in the USA.

Our scores are derived from the World Justice Project's Rule of Law (RoL) Index – specifically the factors of 'Regulatory Enforcement' and 'Civil Justice'.

* In cases where a company's / project's jurisdiction does not appear in the WJP RoL Index, we derive scores for the core team's countries of residence.

2.2. Track Record

2.2.1. Team's Background [Score N/A]

Not scored

3. Decentralization [Score 0.38]

3.1. Regulatory Oversight [Score 0.21]

While FRAX is not directly subject to regulatory oversight, 80% of all collateral is USDC, USDT, USDP and USDC-backed stablecoins. FRAX's score is the weighted average of the scores of each collateral asset.

3.2. Custodian Risk [Score 0.25]

FRAX's reserves are in the custody of a multi-sig wallet controlled by the core team.

3.3. Type of Collateral [Score 0.20]

When evaluating decentralization, it is important to consider the extent to which the stablecoin's value is tied to a central authority or external fiat currency. Monetary policies / decisions taken by such authorities / central banks can have an impact on the purchasing power of the collateral.

Frax is predominantly (~80%) backed by USD-denominated real-world assets which are subject to the monetary policies of the United States.

(Fiat currencies earn a score of 0 and decentralized cryptocurrencies earn a score of 1))

3.4. Decision Making & Voting Power [Score 0.25]

Frax uses the Vote Escrow mechanism pioneered by Curve to determine voting power. Only users who lock their Frax Shares (FXS) are eligible to vote on governance proposals. Currently, ~44% of the overall FXS supply is vote-locked. Of the vote-locked FXS, at least 51% is controlled by the Frax team.

Additionally, through the governance proposal FIP-6 passed in May '21, the Frax core team (also known as Comptrollers) has near-complete control over monetary policy decisions of the protocol, provided FRAX's price is within the price band $0.99~$1.01. Quoting the author of the proposal - "Within the peg bounds, delegated/whitelisted accounts can conduct monetary policy expeditiously so long as the FRAX price peg is within bounds."

For the purposes of determining whether the price is within bounds, the protocol uses FRAX's trading price on Curve. Since Curve is a stableswap DEX, it is highly unlikely that FRAX deviates outside the price-band

except under extreme circumstances (Liquidity pool imbalances). While this may be beneficial for price stability, there is no real 'price discovery' for FRAX in the market and underlying governance issues may not be surfaced through price signals. In such scenarios, Comptrollers continue to exercise significant decision-making authority.

In summary, decision making is centralized in most cases and voting power is highly concentrated as ~22% of the FXS held by team members has more than 51% of the voting power.

3.5. User Blacklisting [Score 1.00]

Frax's smart contracts currently do not support blacklisting of specific user wallets.

4. Governance [Score 0.00]

4.1. Voting System [Score 0.00]

Frax's governance process includes community voting. However, the power to execute protocol changes exists solely with the protocol's core team members. Outcomes of governance votes are currently not enforceable by token holders nor automatically executed on-chain..

4.2. Anti-Governance Attack Measures [Score 0.00]

Frax's governance is currently not enforced on-chain and voting is primarily used as a signaling tool. The implementation of measures such as vote-escrow and time-locks is practically useless.