

Stablecoins

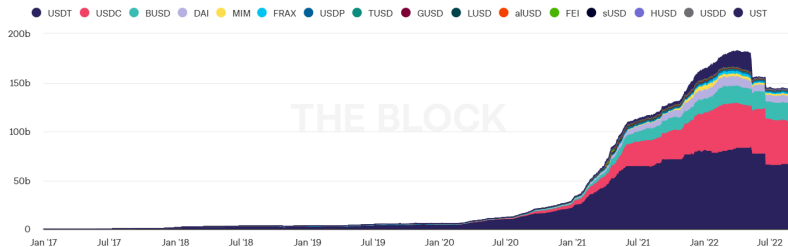
Anthony Lee Zhang

November 3, 2022

Stablecoins!



Total Stablecoin Supply



SOURCES: THE BLOCK, COIN METRICS
UPDATED: AUG 29, 2022

ZOOM ALL YTD 12M 3M 1M

Stablecoins

- ▶ Fiat-backed stablecoins
 - ▶ Basic design
 - ▶ Compliance, macro/micro concerns
- ▶ MakerDAO DAI, other risky asset-backed stablecoins
 - ▶ Design compromises
 - ▶ “Decentralization”?
 - ▶ Basis trade stablecoins
- ▶ Algorithmic Stablecoins
 - ▶ Basic design
 - ▶ Do they work...?

Fiat-Backed Stablecoins

- ▶ Simplest stablecoin design:
 - ▶ I put a USD in Circle's a bank account, Circle issues me a crypto token USDC
 - ▶ Token can be traded around
 - ▶ Any time*, holder can send 1 USDC token to Circle, and Circle sends 1 USD
- ▶ Since tokens are always* redeemable for 1 USD, tokens always worth 1 USD
- ▶ Why are these tokens useful?

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- ▶ Since tokens are always* redeemable for 1 USD, tokens always worth 1 USD
- ▶ Why are these tokens useful?
- ▶ Unlike bank-account USDs, they can be:
 - ▶ Held without US bank account
 - ▶ Sent quickly, without* KYC/AML issues
 - ▶ Used in smart contracts (swaps, derivatives...)
- ▶ “Dollars on steroids”: dollars with crypto functionality

Aside: Stablecoins as the Unit of Account

- ▶ In hindsight, somewhat surprising the extent to which the defi ecosystem has dollarized!
- ▶ The founders of Bitcoin thought of it as an alternative currency, that would displace fiat!
- ▶ Instead, the infrastructure of crypto proved to be useful (wallets, smart contracts...)
- ▶ ... But we still use fiat USD as the unit of account!

Fiat-Backed Stablecoins and Compliance

- ▶ Fiat-backed stablecoins rely on USD deposits in US banks, hence, must* comply with US regulation
- ▶ Circle, Tether token contracts have a blacklist of addresses: anyone blacklisted has their tokens frozen, and can't send/receive
- ▶ Circle blacklists in response to **law enforcement requests**
- ▶ When Tornado Cash was sanctioned, Circle **blacklisted \$75k USDC in Tornado**
- ▶ Blacklists also used in response to **hacks**

*In a purely logistical sense! If they don't, the US can come after their USD

Fiat-Backed Stablecoins: Banking Issues

- ▶ Classically, in the US banking system, banks hold your \$, and provide payment services
 - ▶ Dollars in Chase are more useful than cash dollars! Can pay your utilities, credit card, ACH transfers, Zelle. . .
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 - ▶ Dollars held with Circle can be sent overseas, used on Uniswap. . .

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- ▶ Circle also ends up with a lot of USDs in a bank account!
- ▶ However, Circle generally only invests these in **short-term treasuries**

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- ▶ **Macro concerns:** what are the implications, if Circle takes over, and transaction services fund short-maturity treasuries, instead of mortgages/business loans?
 - ▶ Alternatively, will stablecoin issuers eventually make riskier mortgage/business loans?
 - ▶ Related to “narrow banking” ideas: what if everyone just had an account at the Fed?

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- ▶ **Micro concerns:** Crypto markets are cyclical: when markets crash, USDCs are less useful and everyone tries to redeem
 - ▶ When I redeem, Circle has to sell treasuries to meet my redemption
 - ▶ This could make **demand for treasuries more volatile**, which may affect treasury yield curve

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- ▶ **Audit concerns:** are issuers actually holding \$1 in safe assets for each token? Can't they just make up some tokens?

Fiat-Backed Stablecoins: Project Ideas

▶ **Rising Interest Rates**

- ▶ As interest rates rise, Circle/Tether vulnerable to disruption. . .
- ▶ Is it possible to pass on yields to hodlers, within limits of securities laws?
- ▶ How would we design stablecoin portfolios in a high-rates, high-inflation world?
- ▶ Is there a role for inflation-pegged coins? See [Frax FPI](#)

▶ **Internationalization:** Stablecoins very US-dominated – is there demand for stablecoins in other countries?

MakerDAO DAI

- ▶ Put a bunch of ETH in a “smart contract safe” (“vault”)
- ▶ Print a token, supposed to be worth a dollar
- ▶ Make sure that the ETH in the vault is always worth at least \$1.5
 - ▶ Use a price oracle: on-chain input for ETH-USD price
- ▶ If ETH worth less than \$1.5, and you don't “top up” ETH is automatically sold to cover the debt
- ▶ Behaves like a “crypto margin loan”
- ▶ Highly successful! \$7bil DAI outstanding, largest defi protocol on Defipulse

Analogy: Pawn Shops

- ▶ DAI behaves like a “margin loan”
- ▶ Let's think about a “pawn shop”, where you can “pawn” property, like an iPhone worth \$1,000, for cash up to \$500
- ▶ If you pay \$500 + interest, get your iPhone back
- ▶ No one else can take your iPhone!

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 - ▶ iPhone worth less than \$500: you have no incentive to pay \$500 to get it back
- ▶ Solution: monitor iPhone prices, borrow up to 1/2 of current iPhone price
 - ▶ When iPhone price drops to \$800, can only borrow \$400
 - ▶ Pay back \$100, or pledge more stuff worth at least \$200

MakerDAO DAI

- ▶ ETH worth \$1,500. Overcollateralization rate 150%. By putting 1ETH in “vault”, can print up to 1000 DAI
- ▶ Suppose I print 800 DAI. How much does ETH have to drop for my position to be under-collateralized?

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- ▶ Vault associated DAI gains interest, called “stability fee”

MakerDAO DAI: Leverage

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- ▶ 10% change in ETH price gives you 20% profits!
- ▶ But, if ETH price decreases 10%, you lose 20%!
- ▶ Intuitively, you bought \$2,000 ETH with \$1,000 USD
- ▶ This is leverage: buy with borrowed money, to increase risk exposure

MakerDAO DAI: Vault Mechanics

- ▶ I deposit \$1,500 ETH into a vault, borrow \$800 DAI. When I pay back \$800 DAI, I get my ETH back. Can anyone pay back \$800 and get ETH?
 - ▶ No! Why not?
 - ▶ Otherwise, no one has incentive to put DAI in vaults! Lose ETH whenever unlocked. . .

MakerDAO DAI: Stability...?

Dai Price Chart (DAI/USD)

Last updated 01:55AM UTC. Currency in USD.

Price

Market Cap

Live Chart

24h

7d

14d

30d

90d

180d

1y

Max



Logarithmic

Linear



Nov 18, 2019

→ Aug 29, 2022



CoinGecko

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- ▶ Interestingly, peg often broke to the upside!
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- ▶ “Hacky” solution: make DAI 1:1 redeemable for USDC!

MakerDAO DAI: USDC effect on Prices

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- ▶ Can never be changed!
- ▶ Governance through voting with MKR token, held by founders, and a bunch of VCs
 - ▶ Approx \$1mil MKR voting power is delegated to our student group!
- ▶ Interesting example of a “very decentralized” protocol

MakerDAO DAI: Decentralization

MakerDAO faces a tension of more decentralization vs more impact

- ▶ Approx half of collateral is USDC: what if, hypothetically, Circle blacklisted Maker?
- ▶ Founder [Rune](#) made a radical proposal: float DAI, remove dependence on USDC!
- ▶ See also [here](#)

MakerDAO DAI: Real World Assets

- ▶ DAI is fungible, and inherits the “goodness” of the entire backing collateral
- ▶ If you have enough “good collateral”, you can put in other stuff, and people will probably still be OK

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- ▶ Founder Rune also pushing against RWA efforts
- ▶ Interesting blog post on Maker governance drama

MakerDAO: Takeaways

- ▶ Elegant initial idea!
- ▶ Bunch of “hacks” for implementation
- ▶ “Very decentralized”, but can’t escape partial decentralization. Philosophical direction unclear

The Limits of Risky On-Chain Assets

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 - ▶ In DAI, around 50%!
- ▶ What kinds of assets require more/less margin?
 - ▶ The more volatile X/USD prices are, the higher margin needed
- ▶ On-chain assets tend to be volatile – using them as collateral for stablecoins has low capital efficiency
- ▶ How can we get on-chain assets that have low USD volatility?

Basis Trade Stablecoins

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 - ▶ Like buying S&P 500, shorting S&P 500 futures: you're left with USDs!
- ▶ \$1 of hedged ETH is basically 1 USD! Much higher capital efficiency
- ▶ Examples of projects include UXD, Basis cash
- ▶ Long “spot”, short “futures” called the (spot-futures) basis trade

Basis Trade Stablecoins: Pros and Cons

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- ▶ Pros: high capital efficiency, without using off-chain assets!
- ▶ Cons: basis trade is risky, doesn't perfectly create dollar assets
- ▶ Surprisingly, basis trade has been quite profitable over past few years!
- ▶ Not guaranteed to hold, so uncertain future for these coins

Risky Asset Backed Stablecoins: Project Ideas

- ▶ Real World Assets (RWAs):
 - ▶ **Very hot area!**
 - ▶ Very interesting legal problems in particular: see **6s Capital**
 - ▶ My understanding: create a “legal wrapper” whose “constitution” says, “I do whatever the DAO tells me to”
 - ▶ Gluing the legal system to the blockchain is hard and interesting!
- ▶ Basis trade stablecoins
 - ▶ Any other creative ways to synthesize “on-chain low volatility assets”?

Algorithmic Stablecoins!

So far, stablecoins are kind of boring

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But what if we could **make a dollar out of less than a dollar???**

- ▶ The **undercollateralized/algorithmic stablecoin:** the “perpetual motion machine”, “lead-into-gold transmutation” of defi!

Algorithmic Stablecoins

Every algorithmic stablecoin has same basic idea*:

- ▶ Issue token, supposed to be worth \$1
- ▶ If token worth more than \$1, sell some tokens to push price down to \$1
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Sounds great! What's the problem?

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Sounds great! What's the problem? **Where do you get the money to buy the token?**

*One old reading: [Seignorage Shares](#). Also see whitepapers of [Terra](#) and [Frax](#)

Algorithmic Stablecoins: Design Choices

- ▶ Algo stables have a ton of BS-marketing, but all fundamentally variants of this idea
- ▶ Most have an “equity token”, which has some cash flow/tx fee rights, and is “diluted” to buy the stable token
- ▶ Some hold “fractional reserves” instead of zero reserves (FRAX, IRON)
- ▶ Some have a big pot of money/crypto to defend peg (Terra LFG)
- ▶ Some adjust interest rates as a demand/supply tool, in addition to buying/selling pressure
- ▶ However, smoke and mirrors aside, all boil down to “stabilize prices through buying/selling”

Why Do Algo-Stables Exist?

Good case:

- ▶ We want to have money which is “decentralized”, outside of state control
- ▶ DAI does this, but it’s too expensive/compromised by USDC exposure
- ▶ Algo stables to the rescue! “Cheap” production of stable decentralized money

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- ▶ We want to have money which is “decentralized”, outside of state control
- ▶ DAI does this, but it’s too expensive/compromised by USDC exposure
- ▶ Algo stables to the rescue! “Cheap” production of stable decentralized money

Less good case:

- ▶ I print a token, tell you it’s worth a dollar
- ▶ I sell it to you for a dollar
- ▶ I get a dollar!

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If I make money for every token I print, I end up with a lot of money!

Case Study: LUNA Terra

Terra Luna Classic Price Chart (LUNC/USD)

Last updated 01:29AM UTC. Currency in USD.



Case Study: LUNA Terra

TerraClassicUSD Price Chart (USTC/USD)

Last updated 01:32AM UTC. Currency in USD.



Case Study: LUNA Terra

Terra Luna Classic Price Chart (LUNC/USD)

Last updated 01:29AM UTC. Currency in USD.

Price Market Cap TradingView

24h 7d 14d 30d 90d 180d 1y Max

Line Area Full Screen

Logarithmic Linear

May 6, 2022 → May 14, 2022



Luna Consequences

- ▶ Luna \$37bil, UST \$18bil at peak!
- ▶ Crashed to 0 very quickly, creating a domino effect. . .
- ▶ 3 Arrows Capital crashed, bringing down a number of crypto lenders, creating a general panic
- ▶ See ecosystem lecture, next few classes

Algo-Stables

- ▶ We seem to be out of algo-stable season for now, but the idea seems to come back every cycle or so
- ▶ Like transmutation and perpetual motion machines, I personally think they're flawed at a fundamental level
- ▶ But, crypto is full of surprises. . .

Algo-Stable Project Ideas

Algo-Stable Project Ideas

- ▶ Please don't