

# Stablecoins

Digital Assets - Week 4 (Pre-record)

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# Stablecoins

- ▶ Various important policymakers dismissed early cryptocurrencies as not being money
  - **Key reason:** Their price volatility/instability
- ▶ How can something operate as a store of value, or even a reasonable medium of exchange if it is super volatile
  - It is well known that BTC and ETH are not, in any way, *stable*

# Stablecoins

- ▶ Shopping difficult when BTC might be worth much less by the time you get to the shop!
  - Compare with the very stable purchasing power of the USD (until recently!)
  - Even in recent period, the USD is nowhere near as volatile
- ▶ Not just a problem for shoppers
  - Was holding back the broader crypto ecosystem
  - How are you going to store your profits from a trade?
  - Convert back to fiat? Defeats the purpose in many ways - and is inconvenient

# Stablecoins

*Bitcoin's price rose from just under \$5,000 in March 2020 to over \$63,000 in April 2021 only to plunge almost 50% over the next two months. Intraday swings also can be wild; the cryptocurrency often moves more than 10% in the span of a few hours.*

- [Stablecoin](#), Investopedia - July 6, 2023

# Stablecoins

- ▶ In the absence of digital fiat currency (CBDC), there was an opening for private 'money' creation
  - People started creating tokens whose value was, ostensibly, pegged to the USD (or some other asset)
  - These are termed 'stablecoins'
- ▶ There is a debate as to whether they are securities, or money, or commodities or...
  - I will not discuss those issues
  - Instead, I will focus on their mechanics



# Stablecoins

There are various types of [stablecoin](#) - the three main ones being

- ▶ Fiat backed
- ▶ Crypto backed
- ▶ Algorithmic

**Note:** The best known are typically ERC-20 tokens

- ▶ Though many have since been issued on blockchains other than Ethereum (even Solana, which is not an [EVM-style blockchain](#) in the [first instance](#))

# Stablecoins - Claimed benefits

- ▶ Stability should allow them to be an effective on-chain (and increasingly cross-chain) form of money
  - Useful for transactions and (likely temporary) store of value
  - Depending on design, 'should' be inherently safe (narrow bank)
- ▶ Expanding access to (relatively) inflation-protected USD
  - Especially important for those in high inflation countries / regions with badly managed monetary policy
  - See popularity in [Latin America](#)
- ▶ Rapid global settlement (though remember gas fees)
  - Can provide essentially instant international transfers (relative to slow bank-based rails)
  - Important for [international remittances](#) (existing fees v. high)
- ▶ Promotes digital lifestyle for the un-banked
  - Helps reduce financial and digital exclusion
  - 'Only' need internet access

# Stablecoins - Challenges

- ▶ Various horror stories of complete collapse
  - Prominent example of **UST**
- ▶ Even in the absence of crashes, have repeatedly de-pegged
  - Should **distinguish** redemptions from secondary market pricing
  - Interesting '**singleness of money**' debate over how much de-pegging is 'acceptable'
  - Arguably some concerns are teething problems and have obvious solutions (policy support, improved governance)
- ▶ Centralization
  - Some people regard stablecoins as excessively centralized
  - Dogma for crypto fans (fears of censorship, oppression)
  - Exposes users to regulatory risk, or risks from ties to **tradfi**
- ▶ Regulatory and legislative risk
  - Clarity *perhaps* emerging
  - But ongoing concerns about transparency, AML/KYC
  - Incumbents (banks, swift, MC/Visa) have powerful friends

# Stablecoins - Pros vs cons

**Simple point:** People and policymakers have very different preferences and operate in different contexts, so trading off the various pros and cons can lead to different outcomes across different countries and groups

# Stablecoins

## Top Stablecoin Tokens by Market Capitalization

This page lists the most valuable stablecoins. They are listed by market capitalization with the largest first and then descending in order.

Market Cap  
\$124,513,792,840  
+ 0.13%

Trading Volume  
\$16,819,040,554  
+ 38.67%

Cryptocurrencies

Categories















Telegram Bot

Base Ecosystem

FTX Bankruptcy Estate

SocialFi

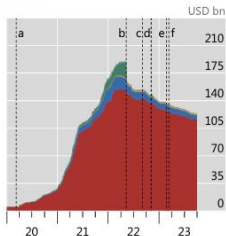
Show rows 100

#	Name	Price	1h %	24h %	7d %	Market Cap	Volume(24h)	Circulating Supply	Last 7 Days
☆ 3	 Tether USDt USDT	\$0.9999	+ 0.01%	- 0.00%	+ 0.02%	\$82,855,514,478	\$21,447,582,138 21,458,020,377 USDT	82,859,580,799 USDT	
☆ 6	 USD Coin USDC	\$1.00	+ 0.01%	- 0.00%	- 0.00%	\$26,136,751,130	\$3,705,224,219 3,704,640,816 USDC	26,135,217,926 USDC	
☆ 12	 Dai DAI	\$0.9991	+ 0.01%	+ 0.05%	+ 0.04%	\$5,343,339,406	\$98,163,664 98,191,423 DAI	5,347,888,596 DAI	
☆ 23	 Binance USD BUSD	\$1.00	+ 0.00%	+ 0.01%	+ 0.04%	\$3,072,320,227	\$947,017,489 946,676,674 BUSD	3,145,564,446 BUSD	
☆ 24	 TrueUSD TUSD	\$0.9987	+ 0.03%	+ 0.08%	+ 0.10%	\$2,903,680,352	\$2,139,942,692 2,141,731,353 TUSD	2,907,449,056 TUSD	
☆ 46	 USDD USDD	\$0.9979	+ 0.04%	- 0.03%	- 0.04%	\$723,807,431	\$24,455,292 24,511,187 USDD	725,332,035 USDD	
☆ 63	 Pax Dollar USDP	\$0.9991	+ 0.01%	+ 0.24%	- 0.15%	\$504,698,939	\$2,847,389 2,857,352 USDP	505,170,765 USDP	

USD stablecoins. Source: [coinmarketcap.com](https://coinmarketcap.com)

# Stablecoins

A. Composition of market capitalisation of total stablecoin market

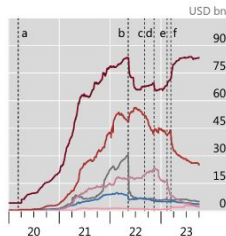


Top 20 stablecoins:

- (A) Fiat-backed
- (B) Crypto-backed
- (C) Commodity-backed
- (D) Unbacked

— Stablecoins outside the top 20

B. Market capitalisation of top five stablecoins<sup>1</sup>



(A) Fiat-backed:

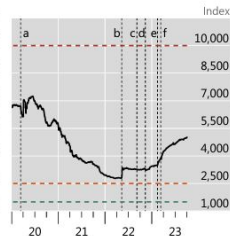
- Tether
- USD Coin
- Binance USD
- TrueUSD

— Total of all other stablecoins

(B) Crypto-backed:

- Dai

C. Herfindahl-Hirschman Index (HHI) of stablecoin market<sup>2</sup>



— HHI

Thresholds:

- Competitive
- Moderately concentrated
- Highly concentrated

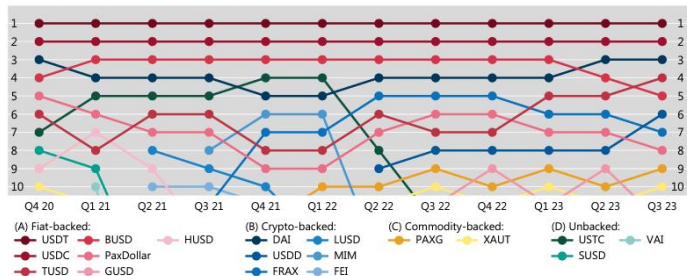
<sup>a</sup> On 11 Mar 2020, WHO declares the Covid-19 to be a pandemic. <sup>b</sup> On 9 May 2022, TerraUSD and Luna collapse. <sup>c</sup> On 5 Sep 2022, Binance announces that it will stop trading USD Coin on its exchange. <sup>d</sup> On 11 Nov 2022, FTX files for bankruptcy. <sup>e</sup> On 13 Feb 2023, Paxos announces that it will stop issuing Binance USD tokens in the United States. <sup>f</sup> On 10 Mar 2023, the Federal Deposit Insurance Cooperation (FDIC) announces the bankruptcy of SVB.

Stablecoin market. Source: [BIS \(2023\)](#)

# Stablecoins

Ranking of top 10 stablecoins by market capitalisation

Graph 2



BUSD = Binance USD; DAI = Dai; FEI = Fei USD; FRAX = Frax; GUSD = Gemini Dollar; HUSD = HUSD; LUSD = Liquidity USD; MIM = Magic Internet Money; PaxDollar = Pax Dollar; PAXG = PAX Gold; SUSD = sUSD; TUSD = TrueUSD; USDC = USD Coin; USDD = USDD; USDT = Tether; USTC = TerraClassicUSD; VAI = VAI; XAUT = Tether Gold.

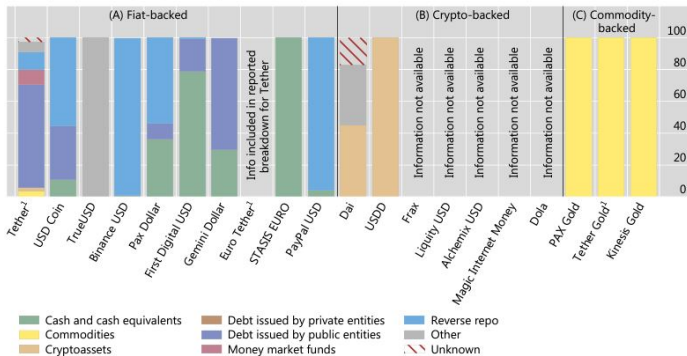
Top 10 stablecoins. Source: [BIS \(2023\)](#)

# Stablecoins

## Breakdown of reported reserves of the top 20 backed stablecoins

End-September 2023, as a percentage of total reserves

Graph 10



<sup>1</sup> Tether publishes only a consolidated reserves breakdown covering all its cryptoassets, including USD stablecoin (Tether), its euro stablecoin (Euro Tether) and Tether Gold. In this graph, we show the gold reserves of Tether Gold separately.

Stablecoin reserves. Source: [BIS \(2023\)](#)



# Fiat stablecoins

- ▶ Collateralized 1:1 with fiat, high quality liquid assets (Treasuries etc.), bank deposits. . .
  - Similar to a deposit with a 'narrow bank'
  - But need to be sure they are appropriately backed
- ▶ Should always be able to cash out 1 unit for \$1
  - Arbitrage 'should' thus keep the price very close to \$1
  - **Examples:** USDC (Circle), USDT (Tether), USDP (Paxos), PYUSD (Paypal), TUSD (TrustToken)
- ▶ USD denominated stablecoins are dominant
  - Some see this as a new and important source of support for the greenback
  - But there are other denominations, such as EUR-backed (notably EURC and EURE)
- ▶ There are also some commodity backed stablecoins
  - **Examples:** PAXG (Paxos Gold) or XAUT (Tether Gold)

# Tether/USDT

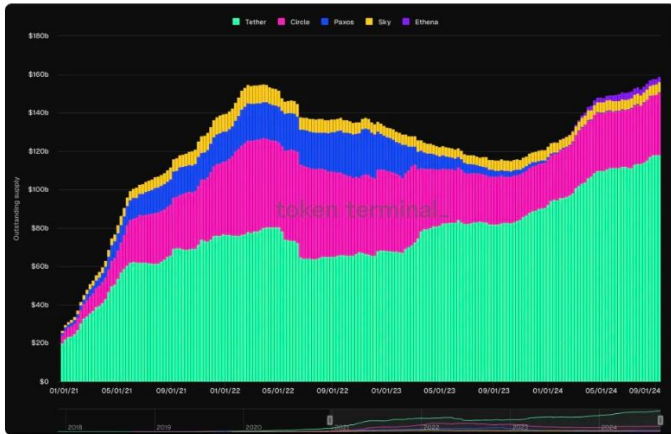
Tether's USDT is the largest stablecoin by market value but has courted controversy

- ▶ Suffered exploits and allegations of inappropriate fund use
- ▶ More questions over its reserves in 2021 and in 2022 it's price dropped to \$0.96
- ▶ Has frequently suffered spikes in *withdrawals* but so far has always honored them 1:1
- ▶ Questions about reserves are ongoing (despite what Howard Lutnick might say)

Nevertheless, its popularity rests on important factors

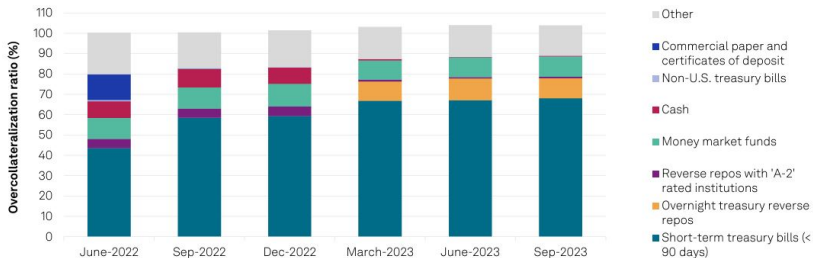
- ▶ Early-mover: broadly accepted - many chains, exchanges
- ▶ Wide user-base can be self-fulfilling through network effects
- ▶ Benefited from USDC's recent difficulties
- ▶ Regarded as less beholden to authorities (good thing?)

# Tether/USDT



Stablecoin market shares. Source: [Yahoo finance \(2024\)](#)

# Tether/USDT



Source: Tether quarterly reserves report.

Evolution of USDT's reserves. Source: [S&P Stablecoin Stability Assessment - Tether/USDT \(2023\)](#)

# Tether/USDT

## Asset assessment

1   Very strong
2   Strong
3   Adequate
<b>4   Constrained</b>
5   Weak

## Adjustment

Neutral (0)
-------------

## Stablecoin stability assessment

<b>4</b>
Constrained

Assessed on a scale of 1-5, where 1 is very strong and 5 is weak.

Assessment of Tether/USDT from S&P. Source: [S&P Stablecoin Stability Assessment - Tether/USDT \(2023\)](#)

# Circle/USDC

Circle is the issuer of USDC

- ▶ Currently the second most dominant stablecoin, after USDT
- ▶ USD fiat-backed
  - See [here](#) for high level summary
  - See [here](#) for a more detailed dive into their 'reserve fund'

## Reserves composition

AS OF OCTOBER 17, 2024

USDC

EURC

### Balances



### Issuance and Redemption

7 DAY CHANGE



30 DAY CHANGE



365 DAY CHANGE



The Circle Reserve Fund is a SEC-registered government money market fund which holds a portfolio of short-dated US Treasuries, overnight US Treasury repurchase agreements, and cash. For more information visit [Circle Reserve Fund](#).

USDC's declared reserves composition. Source: [Circle - October 17, 2024](#)

# Circle/USDC

## Asset assessment

1   Very strong
2   Strong
3   Adequate
4   Constrained
5   Weak

## Adjustment

Negative (1)
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## Stablecoin stability assessment

2 Strong
-------------

Assessed on a scale of 1-5, where 1 is very strong and 5 is weak.

Assessment of Circle/USDC from S&P. Source: [S&P Stablecoin Stability Assessment - Circle/USDC \(2023\)](#)



# Circle/USDC

USDC depegged during the failure of SVB bank (and broader banking strains in the US) in March 2023

- ▶ SVB suffered a run triggered by:
  - losses arising from bad bets on interest rates
  - large uninsured deposits (many were tech firms)
- ▶ Circle was a large depositor - and kept a substantial fraction of its 'cash' reserves with SVB
  - Could not immediately access the reserves during the run
  - Even though most reserves were custodied with BlackRock (in Treasuries) this was enough to undermine confidence
- ▶ Coincided with a weekend  $\Rightarrow$  bank rails were shut  $\Rightarrow$  drove a lot of redemption flow to a small set of crypto markets
  - Selling flow + market dislocation  $\Rightarrow$  depeg in secondary market price (down to the mid \$0.80s)

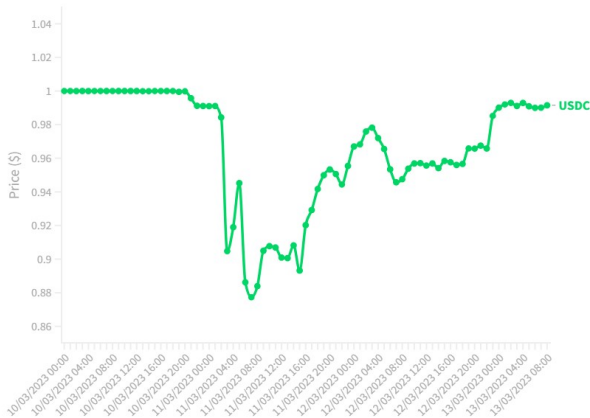
# Circle/USDC



Tweet on stranding of assets at SVB. Source: [Coindesk - March 11, 2023](#)

# Circle/USDC

## USDC: Peg Deviation, March 10 - 13 CryptoCompare



Price of USDC. Source: CryptoCompare

# Circle/USDC

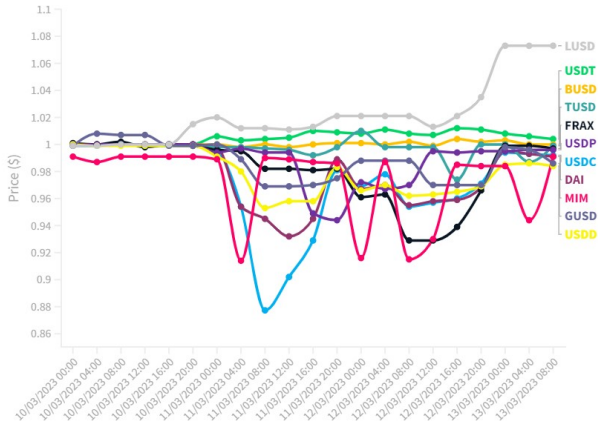
The episode raised important questions:

- ▶ Inadequate liquidity outside the banking system - and worsened with the [demise of Silvergate and Signature Bank](#)
  - Reliance on fractional banks introduces counterparty and technological risks
  - Banking rails do not operate 24/7/365 (such services provided by Silvergate and Signature are now defunct)
  - Something to consider when relying on banks for KYC/AML or (see [MiCA](#)) requiring bank deposits as backing assets
- ▶ Revealed role for policymakers?
  - Why not provide a line of liquidity ([Bagehot's dictum](#))?
  - Fascinating current debate
- ▶ Contributed to debate over centralization risks
  - Explicitly through banking system and reliance on government
  - Also, more subtly, through reliance of other stablecoins (e.g. DAI) on USDC

# Circle/USDC

Stablecoins Depeg, March 10-13

 **CryptoCompare**



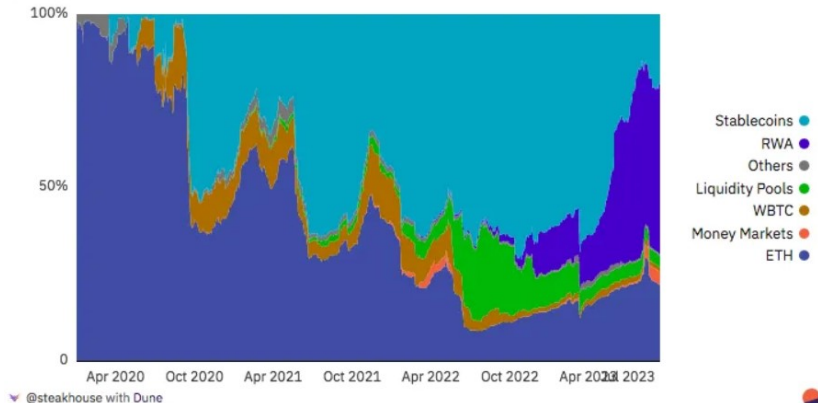
Price of USDC and other stablecoins. Source: CryptoCompare

# Crypto-backed stablecoins / DAI

- ▶ Crypto-backed stables are (over)collateralized with other cryptoassets
  - Overcollateralization reflects of volatility of many cryptoassets
  - Arguably makes the system inefficient - in locking up (more than 1:1) assets that could be used productively elsewhere
- ▶ Best known / most influential is the DAI stablecoin - one of the tokens associated with MakerDAO
  - The other is explicitly a governance token - MKR
  - In fact, MakerDAO has rebranded as Sky, with stablecoin, USDS, and governance token, SKY
- ▶ Although one can quibble about how decentralized it is, DAI is a key element of defi
  - Held a lot of USDC as collateral (now reduced)
  - Governance structure also undermines decentralization claims
  - But reasonable to claim is less centralized than the other stables we have discussed

# Crypto-backed stablecoins / DAI

Assets per type (relative) MakerDAO - Assets per type



Assets backing DAI. Source: [LlamaRisk](#), September 15, 2023

# Crypto-backed stablecoins / DAI

- ▶ Essentially DAI is the result of on-chain collateralized borrowing
  - *Traditionally:* Lock up Ethereum (or other crypto) as collateral, to 'borrow' DAI
  - *Recently:* Can now deposit a broader class of collateral, including [tokenized RWAs](#)
- ▶ Note that this is supposed to be completely managed/implemented by smart contracts (no 'issuer')
- ▶ Some good (though perhaps now somewhat dated) descriptions of the mechanics are [here](#), [here](#), [here](#) and [here](#)



# Crypto-backed stablecoins / DAI

- ▶ Collateralized Debt Positions (CDPs) are created by sending tokens to a smart contract (a 'maker vault') that issues ('mints') DAI
  - On repayment, DAI is destroyed ('burnt') and collateral returned
- ▶ The position must be overcollateralized
  - A greater value of collateral is deposited than the amount of DAI issued
  - Note difference from (in theory) 1:1 backing of fiat stablecoins
- ▶ When the position is closed, the DAI holder pays 'stability fees' in MKR
  - These essentially imply interest rates
- ▶ MKR holders - through the MakerDAO governance smart contracts - can determine terms
  - What collateral is acceptable, collateralization requirements, stability fees, Dai Savings Rate...

# Crypto-backed stablecoins / DAI



## RWA Summary

Vault Code	Transaction Name	Dai Loan Balance	Dai Debt Ceiling	Covenants Passing	Stability Fees MTD	Stability Fees YTD	Stability Fees LTD	Stability Fees LTD (On-Chain)	Variance
RWA-001	6s Capital <sup>1</sup>	14,301,024	15,000,000	Yes	32,173	123,880	130,994	178,007	(47,012)
RWA-002	New Silver	4,485,029	20,000,000	Yes	13,102	138,243	804,930	803,173	1,757
RWA-003	ConsolFreight <sup>2</sup>	1,900,624	2,000,000	No	8,826	54,485	96,702	94,755	1,947
RWA-004	Harbor Trade Credit <sup>3</sup>	1,500,184	7,000,000	No	8,595	52,411	176,262	144,265	31,997
RWA-005	Fortunafi	5,934,200	15,000,000	No	21,214	155,871	349,134	340,530	8,604
RWA-007	Monetalis Clydesdale <sup>4</sup>	1,139,950,318	1,250,000,000	N/A	1,380,375	9,786,319	10,073,382	1,944,188	8,129,194
RWA-008	Societe Generale	-	-	N/A	-	-	211	211	-
RWA-009	Huntingdon Valley Bank	100,000,000	100,000,000	Yes	391,969	2,474,806	2,848,345	58,202	2,790,143
RWA-012	BlockTower 3	45,646,947	80,000,000	Yes	121,120	324,720	324,720	196,780	127,941
RWA-013	BlockTower 4	65,664,580	70,000,000	Yes	223,070	1,342,442	1,346,955	1,113,102	233,853
RWA-014	Coinbase Custody	500,000,000	500,000,000	N/A	2,248	1,103,939	1,103,939	-	1,103,939
RWA-015	Andromeda	602,450,000	1,280,000,000	N/A	18,806	19,502	19,502	8	19,494
NA	GUSD PSM	299,486,832	500,000,000	N/A	821,750	4,375,428	4,855,485	4,033,735	569,944
<b>Total</b>		<b>2,781,319,738</b>	<b>3,839,000,000</b>	<b>-</b>	<b>3,043,248</b>	<b>19,952,047</b>	<b>22,130,562</b>	<b>8,906,956</b>	<b>12,971,800</b>

RWAs backing DAI. Source: [Steakhouse RWA report for Maker, July, 2023](#)

# Crypto-backed stablecoins / DAI

Example of RWA in the backing pool:

## Monetalis Clydesdale (short-term U.S. Treasuries)

- **Dashboard:** [RWA007-A](#)
- **Forum thread:** [Clydesdale Vault HQ](#)
- **Latest report:** [July 31st, 2023](#)
- **Composition:** [IB01](#) (0-1yr Treasury Bond ETF), [IBTA](#) (1-3yr Treasury Bond ETF), and short-term treasury bill held at [Sygnum Custody](#).

Clydesdale, devised by [Monetalis](#), offers a pathway for MakerDAO to direct their stablecoins into liquid bond strategies, having been sanctioned through the [MIP65 proposal](#). The James Asset Trust (JAT) is at the heart of this setup, a trust structure in the British Virgin Islands (BVI). James Asset (PTC) Limited oversees its creation and day-to-day management, with MakerDAO and DAI tokenholders as the beneficiaries.

Bond 'fund' underpinning DAI. Source: [LlamaRisk, September 15, 2023](#)

# Crypto-backed stablecoins / DAI

Following this [excellent guide](#):

- ▶ If the price of DAI is trading below \$1. . .
  - Suggests more supply than demand
  - Implies stability fee must  $\uparrow$
  - Why? Makes loans more expensive
  - Promotes repayment/supresses borrowing
  - Repayment of DAI loans reduces the supply of DAI (DAI is burnt)
  - Should promote price of DAI  $\uparrow$  to peg of \$1
- ▶ If the price of DAI is trading above \$1. . .
  - Similar process in reverse

Thus, DAI has some elements of an *algorithmic* stablecoin, but its reliance on collateral distinguishes it

# Crypto-backed stablecoins / DAI

Another tool to manipulate demand is the [Dai Savings Rate](#)

- ▶ Encourages people to demand DAI by offering a yield
- ▶ While locked up (in a SC) the DAI earns the DSR
- ▶ Funded out of stability fees
- ▶ DSR adjusted at relatively high frequency (in comparison with stability fees etc)
- ▶ If market price of Dai above (below) 1 USD, DSR will decrease (increase)

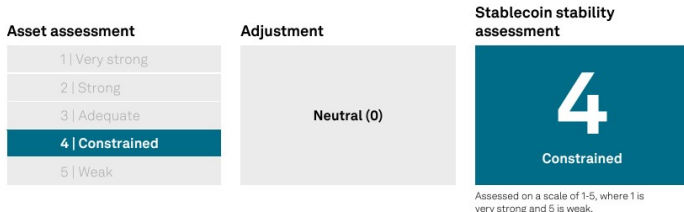
# Crypto-backed stablecoins / DAI

- ▶ If value of the collateral falls below a particular threshold, then the position can be 'liquidated'
  - Aim is to ensure DAI is always (more than) fully backed - underpinning the \$1 peg
  - Price oracles important in tracking the value of collateral
- ▶ In a liquidation, automated market participants (**keepers**) can close out the position
  - Can bid for and buy the collateral (at a discount)
  - Use to pay off the outstanding debt
- ▶ Very different from tradfi
  - Process is open to external parties and is automated

# Crypto-backed stablecoins / DAI

- ▶ Less centralized than the fiat-backed stablecoin but...
  - Rebranding as SKY and transition from DAI to USDS seems to increase centralization
  - Notably, there is a [freeze](#) function for USDS
  - Circle and Tether already have shown willingness to submit to regulator/official requests (and shut down addresses / tokens associated with particular addresses)
  - DAI had been regarded as less subject to influence
- ▶ Important to understand the aim that DAI has/had (and many of its supporters still have)
  - Provide a form of on-chain money, with stable value, that can drive the DeFi system
  - But times change (interesting takes [here](#))

# Crypto-backed stablecoins / DAI



Assessment of DAI from S&P. Source: [S&P Stablecoin Stability Assessment - DAI \(2023\)](#)



# Algorithmic stablecoins

Algorithmic stablecoins are regarded as somewhat shaky and many have failed

- ▶ Most spectacular example was [TerraUSD](#)
- ▶ Why so shaky?
  - Not backed by any fiat, HQLA or overcollateralizing crypto
  - Rely on complicated algorithms (implemented in smart contracts) to adjust supply of the token
  - **Intent:** Even as demand varies, supply varies (burning or minting) enough to keep the price at \$1

**We will return to this in discussing regulation later in the course. . .**