# Stable Is as Stable Does

- TYPE: Stablecoins
- CHAINS: All
- MARKET CAP: $158 BILLION

Stablecoins are fundamental to digital finance. At $158B total value they comprise over 12% of the total digital assets market capitalization. A stablecoin is a digital asset intended to reflect another asset's price, specifically fiat currency like USD. Stablecoins can theoretically reflect any fiat currency price on-chain. Practically, all stablecoins offer varied models of collateralization and centralized control that balance risk and stability attuned with user preferences. Essentially, stablecoins facilitate digital asset transactions between traditional and digital financial infrastructure. Effectively, they work as dollars on the blockchain.


Stablecoin Market Capitalization
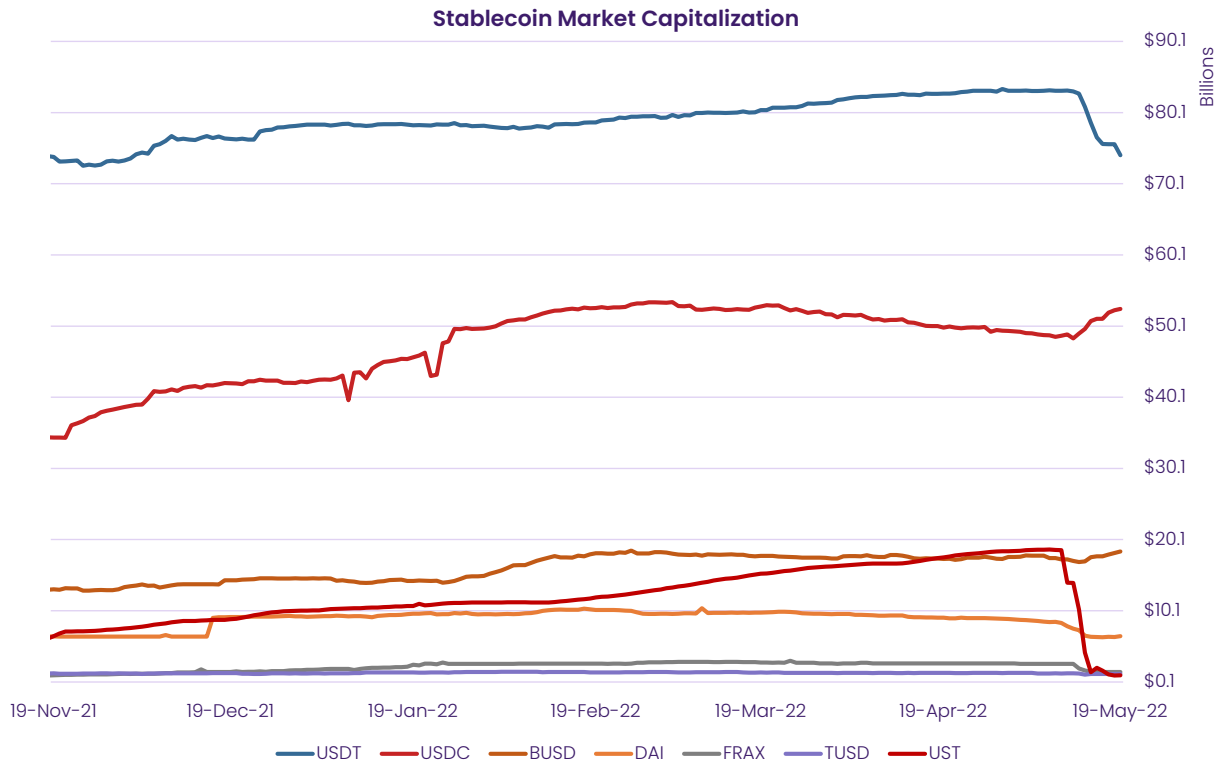
Enter the Stablecoin Matrix

Exogenous or endogenous pricing models maintain fiat prices on-chain. Most stablecoins use exogenous pricing to match the external fiat price. Some endogenous models attempt to create a self-managed or automated system to maintain internal price equilibrium. Historically, exogenous models maintained their USD peg much more successfully than endogenous models.

Stablecoin governance exists on a spectrum from centralized to decentralized. Assets like Circle's USDC and Tether's USDT are centralized or maintained by corporate entities subject to shareholders, applicable laws, and regulations. On the other end, protocols like MakerDAO's DAI are decentralized and permissionless for users to issue and redeem stablecoins against digital asset collateral. All other stablecoin projects exist within this spectrum, potentially at many points over time.

Exogenous Pricing

Decentralized		Centralized
DAI		BNB USDT
		GSUD USDC
		TUSD
sUSD UST		

Endogenous Pricing
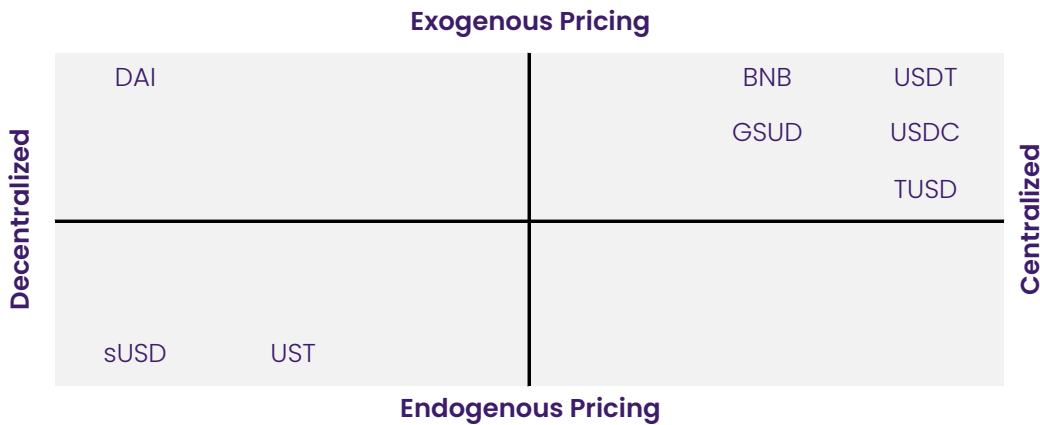
(*All stablecoins listed in the top-right quadrant exclusively use exogenous collateral and are assumed to be equally centralized to USDC and USDT.*)

Centralization

Both Circle's USD Coin (USDC) and the Tether Token (USDT) are blockchain assets meant to maintain a 1 token to $1 exchange rate. The tokens operate on several blockchain networks and in multiple digital asset exchanges. Users must open an account with the Circle or Tether company to issue either USDC or USDT. Account holders are subject to the user agreement, due diligence, and anti-money laundering and counter-terrorism financing (AML-CTF) required in the users' jurisdiction. Once approved, account holders deposit USD collateral to receive USDC and USDT at an exchange rate of 1 token per $1 of collateral value.

The companies control all accounts and tokens, segregated from corporate funds. Circle's user terms describe USDC as a "form of stored value or prepaid access," to Circle's money transmission network. All USDC users and account holders may have to comply with a relevant jurisdiction's laws. To enforce these laws, Circle may freeze Accounts for the user to become compliant.

Both Circle and Tether reserves face intense market and regulatory scrutiny around the solvency and transparency of their reserves. Quarterly, both companies release attestations that their reserve assets match or exceed issued tokens. Accounting firms attest that the value is fairly stated to assure investors and token holders that each token remains backed by $1 of collateral.

Other centralized stablecoins include Binance's BUSD, TrustToken's TUSD, and Gemini's GUSD. Each of these are controlled similarly to Circle and Tether, with reserves stored on or off-chain. In all cases, centralized stablecoins require an entity to maintain the stablecoin as a liability and custody reserve assets.

Reserve Account Report, Circle Internet Financial, LLC		
Circle Internet Financial, LLC	Dated	4/29/22
Reported by Grant Thornton LLP		
Total USD Coin (USDC) in circulation:		$51,388,555,903
Total fair value of US Dollar denominated assets held on behalf of USDC holders is at least equal to:		$51,388,555,903

Consolidated Reserves Report		
Tether Holdings Limited	Dated	5/18/22
Reported by MHA Cayman		
Consolidated total assets:		
Cash & Cash Equivalents & Other Short-Term Deposits & Commercial Paper		
Commercial Paper & Certificates of Deposit		$20,096,579,998
Cash & Bank Deposits		$4,100,485,805
Reserve Repurchase Agreements		$105,331,269
Money Market Funds		$6,798,150,552
U.S. Treasury Bills		$39,199,221,428
Non-U.S. Treasury Bills		$286,155,289
Subtotal		$70,585,924,341
Secured Loans (non to affiliated entities)		$3,149,732,368
Corporate Bonds, Funds & Precious Metals		$3,729,529,946
Other Investments (including digital tokens)		$4,959,634,446
Total		$82,424,821,101
Conolidated total liabilities:		
Digital tokens issued		$82,188,190,813
Other liabilities		$74,239,266
Total		$82,262,430,079

Stablecoin protocols, like MakerDAO, exist exclusively on blockchains with decentralized control. Governance participants stake the MKR token to gain voting power proportionate to their share of total staked MKR. These participants decide the protocol's operational and risk parameters to control DAI supply and maintain system health. Users mint and borrow the DAI token by staking ETH and USDC collateral into smart contracts called collateralized debt positions, or CDPs. Users unlock CDP assets with full DAI repayment. Each CDP must maintain an overcollateralized ratio to minted DAI or face liquidation. Since launching DAI in 2017, the MakerDAO community iteratively added stabilization mechanism to reinforce liquidation's role in keeping DAI at $1 throughout the market cycle.

Other decentralized stablecoins include Synthetics sUSD, the Frax FRAX, and Terra's recently failed UST algorithmic stablecoin. While each of these are decentralized like MakerDAO, each uses different governance and coordination models to control their respective protocols. In most cases, the governance token aligns user incentives to make decisions regarding the stablecoin's risk and stabilization parameters.

Collateralization

Collateralized stablecoins are backed by assets held in reserve that can be redeemed for the token on demand. Collateral is diverse across this spectrum but predominately includes fiat currency, cash-equivalent securities, and digital assets. Fully or over-collateralized stablecoins are intended to match each circulating token with an equivalent value of liquid reserve assets. All stablecoins attempt to maintain USD price with either exogenous or endogenous pricing models.

Exogenous models issue USD stablecoins against a fixed unit of either digital or fiat-based collateral. This allows users to deposit or exchange $1 of collateral assets for 1 stablecoin, so a stablecoin is always worth $1, regardless of the market price and oracle data. Most stablecoins systems use exogenous pricing models to maintain the fiat price peg regardless of the reference source. While an oracle protocol can input traditional financial data to the blockchain as a reference-of-record, oracles represent singular points of failure when they fail or are manipulated. So, stablecoin protocols use issuance and redemption models to maintain the 1:1 USD exchange rate.

Endogenous models attempt to remove all external reliance from the stablecoin protocol to achieve an internal price equilibrium. These algorithmic stablecoins mint and issue USD-based assets against an algorithmically defined exchange rate to the protocol's share asset. To maintain the equilibrium, the protocol controls both the share asset and stablecoin supply across all levels of demand. Most endogenous models, like Terra's UST, replace collateralization with a dynamic mint & burn supply algorithm.

In UST's model, the protocol issues an asset in an amount equal to the peg price. This way, arbitrageurs sell the stablecoin for the newly minted assets at a discount to the market, which maintains the stablecoin price at the desired peg. Conversely, when the stablecoin is above peg, arbitrageurs sell it for the protocol asset to the secondary market. The protocol asset can then be redeemed with the smart contract for the market value of the stablecoin to earn a profit.

Economics & Stability

Recent studies show centralized stablecoins with exogenous pricing models maintain their USD price better than other types. Jarno and Holodziejczk 2021 found that "tokenized funds," or centralized exogenous coins, like USDC and USDT, maintained the lowest peg price volatility out of 20 stablecoins. The tokenized funds were one of three types studied alongside "collateralized (on-chain)," like DAI, and "algorithmic" stablecoins, like Terra. Additionally, no other types of "stabilization mechanisms work smoothly enough to match the automatic adjustment of tokenized funds." They noted that 1:1 reserves backing stablecoins were the strongest mechanism to maintain the price pegs.

Similarly, Kozhan and Viswanath-Natraj 2021 concluded that MakerDAO's decentralized exogenous model maintained DAI's price stability after USDC was added to ETH as a collateral type. DAI price was most unstable during prolonged periods of ETH returns and high volatility. However, DAI price stabilized significantly after MakerDAO introduced USDC collateral and the peg stability mechanism in 2020. With the PSM, MakerDAO swaps USDC reserves for DAI at a 1:1 rate. The study noted that the USDC:DAI mechanism opened an arbitrage opportunity that compressed the DAI price range by 92%. The authors concluded that the DAI model demonstrated that "stablecoins need to be backed by stable, risk-free reserves," to minimize their peg deviations.

Conclusion

Stablecoins represent a key innovation uniquely enabled by blockchains but familiar to finance. As digital assets, stablecoins facilitate fiat-denominated commerce in an open-source environment without third-party control or intervention. However, a reliable fiat price peg requires totally centralized collateral and open market redemptions like central bank or financial institutions perform. What looks like a contradiction reveals a stratification familiar to traditional credit market participants.

Because stablecoins exist in a wide range of centralization and collateral types, they serve needs based on their use case, with matching risk and stability. Blockchain users aiming for lowest risk and highest stability must accept that centralized entities ultimately control their stablecoins. Users that seek self-custody and open composability must stomach price volatility. Recent literature shows DAI's volatility improved nearly in line with centralized stablecoins. While no universal stablecoin exists, most users can find a stablecoin solution to their unique problem.

References

Circle. (2022, 03 15). *USDC Terms*. Retrieved from circle.com:
https://www.circle.com/en/legal/usdc-terms

Grant Thornton LLP. (2022). *Report of Independent Certified Public Accountants to the Board of Directors and Management of Circle Internet Financial, LLC.* Grant Thornton LLP.

Jarno, K., & Holodziejczk, H. (2021). Does the Design of Stablecoins Impact Their Volatility? *Journal of Risk and Financial Management*, 11-14.

Kozhan, R., & Viswanath-Natraj, G. (2021). *Decentralized Stablecoins and Collateral Risk.* Warwick Business School.

Messari. (2022, 5 19). *Circulating Market Cap*. Retrieved from Messari.io: https://messari.io/

MHA Cayman. (2022). *Independent Accountant's Report to the Board of Directors and Management, Tether Holdings Limited.* MHA Cayman.

Sams, R. (2015). *A Note on Cryptocurrency Stabilisation: Seiniorage Shares.* clearmatics.com.

Tether Holdings Limited. (2022, 05 22). *Terms of Service*. Retrieved from tether.to:
https://tether.to/en/legal/#terms-of-service

DISCLAIMER