S&P Global
Ratings

Stablecoin Stability Assessment

Dai

Dec. 12, 2023

Summary

S&P Global Ratings assesses Dai's ability to maintain its peg to the U.S. dollar at '4' (constrained). Dai is a decentralized stablecoin issued through the MakerDAO protocol that maintains its peg using a peg-stability module.

Our asset assessment of 4 reflects the lowest quality we observed in Dai's vaults that we consider material. The collateral (or reserves) backing this stablecoin includes real-world assets (RWAs), such as bonds and securitization. Previously, the collateral comprised mainly cryptocurrencies such as Wrapped Bitcoin (WBTC), Ethereum (ETH). In our view, RWAs increase and diversify the protocol's revenue, but also the risk profile of the assets, since some RWAs introduce credit risk and are less liquid.

We make no adjustment from the asset assessment despite certain weaknesses in governance. This is because we consider these weaknesses, which relate to a concentration of decision-making powers, untested liquidation processes, and secondary market liquidity, to be commensurate with an assessment of 4. Dai depegged from the U.S. dollar in March 2023, mirroring USD Coin (USDC). We note MakerDAO has enhanced DAI's peg-stability module using three stablecoins over time.

The stablecoin stability assessment could improve if we observe a significant shift toward lower-risk assets. Factors such as governance (concentration of decision-making powers and untested liquidation processes) could also support a stronger assessment. In contrast, the use of what we consider riskier assets, such as more specialized RWAs, could result in a weaker stablecoin stability assessment.

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For more on our approach and definition of price stability, see our Analytical Approach: Stablecoin Stability Assessments »

This report was not produced at the request of the stablecoin issuer or sponsor.

Asset assessment

1 | Very strong
2 | Strong
3 | Adequate
4 | Constrained
5 | Weak

Adjustment

Neutral (0)

Stablecoin stability assessment

4

Constrained

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

Asset assessment: 4 | Constrained

1 | Very strong	2 | Strong	3 | Adequate	**4 | Constrained**	5 | Weak

Dai is backed by collateral deposited in vaults by borrowers (vault owners) in the Maker protocol. Each vault in the protocol is organized based on a single collateral type and risk parameters, including a borrowing interest rate, a minimum overcollateralization threshold, and a debt ceiling. Vault owners borrow Dai created by the protocol against their collateral. If the collateral value falls below the minimum overcollateralization threshold, their collateral is liquidated for Dai to repay the debt.

An important aspect of the Maker protocol is that collateral is not fungible across vaults. This means that, if a vault is undercollateralized, the shortfall will not be covered by excess collateral from another vault. Rather, if a vault is liquidated and the liquidation proceeds are insufficient to cover the debt, the shortfall is covered through a Dai surplus fund. If this fund is exhausted, the protocol will issue an amount of Dai's native Maker token sufficient to cover the remaining shortfall. The size of the Dai surplus fund is limited to $50 million as of the date of this publication. This surplus can be replenished through revenue generated by vaults and is available to cover potential defaults on vaults, if any. However, we do not consider the issuance of Maker tokens to mitigate risk, since these tokens are endogenous assets to the protocol. To assess the risk of loss on Dai's reserve assets, we consider the risk profile of each vault individually, and the sufficiency of the surplus fund to cover losses in aggregate.

Our analysis focuses on risks to Dai's stability from the perspective of all Dai holders rather than specific vault owners. Once vault owners have created Dai through the protocol, this Dai can be used to make blockchain transactions, such that Dai may be held by anyone, not only vault owners. In contrast to the collateral assets, Dai tokens are fungible, meaning that Dai holders are not exposed to one specific vault but to the risk of any loss across all vaults.

The Maker protocol's emergency shutdown mechanism illustrates the relative risk positions of Dai holders and vault owners. In the event of significant stress on the protocol, its governance may initiate an emergency shutdown intended to redeem all outstanding Dai from the available collateral. If this happens, vault owners will be prioritized during an initial period; they can repay their Dai debt to take back their collateral from the vault. Dai holders cannot redeem their Dai during this initial period but only once it ends, and for a pro rata share of the remaining collateral. Vault owners are likely to repay their Dai to take back their collateral if their vault remains overcollateralized, but are unlikely to repay if their vault is undercollateralized. Assuming that overcollateralized vaults are repaid and undercollateralized vaults are not, the collateral that remains available to repay Dai holders will be sufficient only if the surplus fund has enough to cover the shortfall in undercollateralized vaults. Therefore, from the perspective of a Dai holder, the risk of not being able to redeem the same value of Dai is linked to the risk of a shortfall across undercollateralized vaults that exceeds the surplus fund.

To assess the risk of each vault becoming undercollateralized, we consider the nature of the collateral asset, the liquidation threshold and mechanism, and the ability to liquidate each collateral type. Our asset assessment of 4 (constrained) reflects the lowest quality we observed across those vaults that we consider material relative to the size of the surplus fund. As of Nov. 14, 2023, this corresponds to nearly 22% of Dai's collateral--including the Wrapped Staked ETH (WSTETH) vault, which represents 12% of Dai reserves. The assets comprise:

- **Crypto-related vaults totaling $1,308 million (24.6% of reserves) as of Nov. 14, 2023**. This is a combination of multiple vaults backed by either ETH, WBTC, Wrapped Staked ETH (WSTETH), or Rocket Pool ETH (RETH). Each vault would support an asset assessment of 5

(weak). The asset assessment is 3 (adequate) for ETH and Bitcoin vaults, based on the relatively high minimum overcollateralization ratio (averaging 155% and 130%-175%, respectively) as well as ample liquidity available for these tokens compared to the relative size of the vaults. In contrast, the asset assessment of the WSTETH and RETH vaults is 4 (constrained), based on the minimum overcollateralization ratios of 167% and 150%, respectively. We did not determine a stronger assessment because the protocol's ability to liquidate a significant amount of WSTETH in a market stress scenario is untested and uncertain. The protocol itself proved resilient through severe market-value declines in crypto assets in 2022. However, WSTETH was not a material share of reserves at that time.

- **RWA007-A (Monetalis Clydesdale vault) totaling $1,250 million (23.5% of reserves) as of Nov. 14, 2023**). This vault comprises a combination of U.S. short-term treasury bills with tenors of less than six months. We note the vault also comprised U.S. treasury exchange traded funds from Blackrock that was sold on Oct. 5, following a Maker resolution vote. Assets are deposited with the custodian Sygnum (established in 2018 and thus has a limited track record) in segregated accounts for the ultimate benefit of MakerDao. This vault would support an asset assessment of 3 (adequate).
- **RWA015-A (Blocktower Andromeda vault) totaling $1,380 million (25.9% of reserves) as of Nov. 14, 2023**. This vault comprises a combination of U.S. short-term treasury bills with tenors of up to six months. Assets are deposited with the custodian, Wedbush Securities Inc. (established in 1955), in segregated accounts for the ultimate benefit of MakerDao. This vault would support an asset assessment of 2 (strong).
- **RWA014-A (Coinbase vault) totaling $100 million (1.9% of reserves) as of Nov. 14, 2023.** This vault comprises USDC tokens held with Coinbase Custody International Ltd. (CCI) under the Coinbase Institutional USDC Rewards Program. CCI is an Irish subsidiary of Coinbase Global (established in 2019 and thus has a limited track record). This vault would support an overall asset assessment of 3 (adequate).
- **RWA009-A (HV Bank vault) totaling $100 million (1.9% of reserves) as of Nov. 14, 2023.** This vault comprises an unsecured loan to HV Bank (not rated). This vault would support an asset assessment of 4 (constrained).
- **Peg-stability module (mixed stable coins) totaling $479.7 million (9% of reserves) as of Nov. 14, 2023**). The peg-stability module comprises three stable coins: USDC, Pax Dollar (USDP), and Gemini Dollar (GUSD). Our stablecoin stability assessments for each of these coins is 2 (strong); therefore, the asset assessment of this vault is also 2.
- **Other assets totaling about $171.8 million (3.2% reserves) as of Nov. 14, 2023.** This consists of Uniswap liquidity pools of stablecoin pairs (Dai/USDC), mainly Uniswap V3. It is important to note that the Dai in this liquidity pool is already-minted Dai backed by other types of collateral. These liquidity pools comprise a combination of Dai and USDC, which could under--certain market conditions--be mostly Dai. We therefore equalize our asset assessment of this vault with our stablecoin stability assessment of 4 for Dai.
- **Other RWA vaults totaling about $158.9 million (3.0% reserves) as of Nov. 14, 2023.** These vaults comprise various exposures, including business loans, trade receivables, and private unrated securitization products like asset-backed securities and collateralized loan obligations. These vaults would typically have an asset assessment of 5 (weak) considering the limited liquidity of such assets in the market. However, all have overcollateralization of 10%-30%. Also, there is the Dai surplus of $50 million, which could be replenished by revenue from all vaults, compensating for additional losses on the aggregate amount in all vaults. Based on these mitigants, our asset assessment is 4.

Adjustment: Neutral

Neutral | Negative

Overall adjustment

We see weaknesses in governance due to a concentration of decision-making powers and untested liquidation processes, notably in the lack of a regulatory framework and secondary market liquidity. However, we consider these weaknesses commensurate with an assessment of 4 (constrained), with no further adjustments from the asset assessment.

Governance: Decentralized in name only

- There is a high degree of transparency on upcoming changes and proposals open to a vote. However, there is also a high concentration of holders of the Maker governance token. This is especially true when considering active voters. In particular, co-founder Rune Christensen maintains significant influence in the MakerDAO community. Furthermore, we note that the co-founder is an investor in Monetalis, the entity that acts as arranger/manager on behalf of MakerDao for the largest RWA vault.
- Anyone can verify the composition of the reserves on the blockchain in real time. This provides full transparency regarding the on-chain assets but does not provide transparency or verification in the case of RWAs. Third-party verification of assets held off the blockchain that back the RWA vaults is not consistently available.
- MakerDAO has sought to increase the profitability of the protocol by holding reserves in RWAs. Although this can reduce the linkage between reserve values and crypto market volatility, it also introduces credit risk, as demonstrated by the recent default of several underlying loans within certain Centrifuge RWA vaults--RWA003--Centrifuge (ConsolFreight), and RWA004 (Harbor Trade Credit) for which the financing was halted, and further lending reduced to zero. Although some legal and credit assessment is provided before the vote, it is questionable whether the governance voters have sufficient legal and finance expertise to review the inclusion of all RWAs, especially more complicated assets such as private securitizations.
- The liquidation process for RWA vaults involves several counterparties, such as custodians and brokers. Therefore, the need for human decisions and intervention leads to time delays in liquidating the collateral. Furthermore, the protocol's ability to liquidate such assets in a market stress scenario is untested.
- MakerDAO's founder has publicly suggested loosening or removing the Dai's peg to the U.S. dollar, which if implemented could result in an overall weaker stablecoin stability assessment.

Regulatory framework: Absence of a regulatory regime for decentralized stablecoins may inhibit adoption and liquidity

- Reserve assets for crypto-related vaults are locked in a smart contract and not in the custody of a centralized entity, limiting the risk of assets being tied up in bankruptcy proceedings. However, it is uncertain how any dispute to the outcome of a smart contract would be treated in courts in different jurisdictions.
- Reserve assets for RWAs are typically held by custodians in segregated accounts for the benefit of MakerDAO.

- The absence of a regulatory regime for decentralized stablecoins, and the emergence of regulatory frameworks for centralized stablecoins across different jurisdictions, may favor the use and liquidity of centralized stablecoins over decentralized stablecoins.

Liquidity and redeemability: The peg-stability module allows 1 to 1 trading with major stablecoins

- As a decentralized stablecoin, Dai cannot be redeemed by an issuer per se, although it can be redeemed against remaining collateral in the event of a shutdown of the protocol. Dai holders must rely on centralized exchanges to convert Dai into fiat U.S. dollars, or use decentralized exchanges to swap Dai for other ERC-20 tokens, the technical standard for interchangeable tokens using the Ethereum blockchain.
- However, anyone can exchange Dai 1 to 1 for three other stablecoins (USDC, GUSD, and USDP) through an on-chain peg stability module. This has a volume of $479.7 million as of Nov. 14, 2023, or approximately 9% of outstanding Dai.
- Although daily trading volumes for Dai appear high, they are significantly lower than for the main centralized stablecoins: USDT and USDC.

Technology and third-party dependencies: A resilient setup so far, despite complexities and dependencies

- The Maker protocol is deployed on Ethereum Mainnet only.
- Dai smart contracts are more complex than for a centralized stablecoin, since they govern the liquidation mechanisms and peg-stability module. However, the smart contracts have been audited by multiple auditors, with no critical or high-risk observations. We note the latest full audit is not recent, since it was performed in October 2019, although specific assessments from auditors were conducted in August 2021 on the liquidation 2.0 contract. The contracts are written in a well-tested language (Solidity) and follow an established standard, the ERC (Ethereum request for comment). Public participation in identifying and addressing issues is encouraged through a bug bounty program that offers compensation for identifying and reporting vulnerabilities.
- Absent a centralized issuer, the Maker protocol relies on third parties to perform key functions, including:
  - A community of developers to maintain the smart contract and implement any fixes or upgrades needed.
  - Keepers to support the liquidation mechanism. Keepers are protocol participants who purchase the collateral from vaults that fall below their liquidation trigger; they are rewarded with a liquidation fee. The protocol's economic resilience is dependent on these keepers providing sufficient liquidity to ensure successful and timely liquidations. That said, the liquidation mechanism proved resilient through material sell-offs in 2022.
  - Price feeds (oracles) to inform the collateral liquidation mechanism. The main oracle used is Chronicle Labs, which is run by 22 different operators. Oracle risk--the risk of interruption, manipulation, or inaccuracy in the data--is mitigated by using a median from multiple price feeds through this protocol and safeguards in the Maker protocol against stale or zero prices.

- The more recent RWA vaults introduce new dependencies and counterparty risks from the managers of those assets as well as the custodian or brokers, which could delay the liquidation process.

Track record: Depegged due to USDC exposure that has since reduced

- Dai depegged from the U.S. dollar in March 2023, mirroring the depegging of USDC. At that time, Dai's reserves and specifically its peg-stability module were materially exposed to USDC.
- We note MakerDAO has enhanced the composition of reserves over time, with the peg-stability module split between three stablecoins.
- Dai has operated with more than $1 billion in circulation and has demonstrated relative stability over the past two years.