MakerDAO
2023 Annual Report

DAO Retrospective

By Steakhouse Financial

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0. Front Matter

0.1. Legal Disclaimer

This communication is provided for information purposes only. This communication has been prepared based upon information, including market prices, data and other information, from sources believed to be reliable, but such information has not independently been verified and this communication makes no representations about the enduring accuracy of the information or its appropriateness for a given situation. This content is provided for informational purposes only, and should not be relied upon as legal, business, investment, financial or tax advice. You should consult your own advisers as to those matters. References to any digital assets and the use of finance-related terminology are for illustrative purposes only, and do not constitute any recommendation for any action or an offer to provide investment, financial or other advisory services. This content is not intended to promote the sale of any digital assets and may not under any circumstances be relied upon when making a decision to purchase any digital asset referenced herein. The digital assets referenced herein currently face an uncertain regulatory landscape in not only the United States but also in many foreign jurisdictions, including but not limited to the United Kingdom, European Union, Singapore, Korea, Japan and China. The legal and regulatory risks inherent in referenced digital assets are not the subject of this content. For guidance regarding the possibility of said risks, one should consult with their own appropriate legal and/or regulatory counsel. Charts and graphs provided within are for informational purposes solely and should not be relied upon when making any decision. The content speaks only as of the date indicated. Any projections, estimates, forecasts, targets, prospects, and/or opinions expressed in these materials are subject to change without notice and may differ or be contrary to opinions expressed by others.

0.2. About Maker

Created in 2014, Maker is an open-source decentralized stablecoin project built on the Ethereum blockchain. The Maker Protocol, enables users to create the Dai stablecoin by depositing collateral. The project is governed by MakerDAO, a Decentralized Autonomous Organization, consisting of people around the world who hold Maker's governance token, MKR. Through a system of governance involving Executive Voting and Governance Polling, MKR holders manage the Maker Protocol and regulate the Dai stablecoin to ensure its stability, transparency, and efficiency.

0.3. About Steakhouse Financial Ltd

Steakhouse Financial is a web3 consulting services firm composed of seasoned crypto-native collaborators with broad experience including finance advisory, strategy, investment banking, analytics, accounting, legal research, and coding. Steakhouse Financial supports MakerDAO by providing the protocol's economics and real world asset reporting, performing commercial and risk assessments for RWAs, and advising on asset-liability management. In return for these services, Steakhouse Financial is compensated by MakerDAO as an Ecosystem Actor.

0.4. Steakhouse's Motivation for Writing

Steakhouse Financial's mission is to provide transparent economic reporting and analysis for crypto organizations. In support of that mission, we have written this report to help facilitate a better understanding of the Maker Protocol and DAO.

Crypto protocols are notoriously complex. Our goal is to make them more understandable for broader accessibility. In order for this industry to succeed long term and truly democratize finance, lowering the barrier to entry for participation is critical. We hope this report and subsequent ones are one small step closer to making that a reality.

Steakhouse believes deeply in open-source, which is one of the key reasons we build our business intelligence dashboards and queries on transparent software like Dune Analytics. We strongly agree with Dune's mantra that "the revolution will not be reported quarterly." We are advocates for increased openness in financial markets through democratization of data access - challenging the current oligopoly of paywalled financial data providers.

A beautiful aspect of blockchains is that the data they produce is free for everyone to access. Today, this data and the visualization of it is quite difficult to access. However, we believe the benefits of open source and the power of compounding learnings from the collective developer community will lead to tremendous growth and improvements in accessibility. Ultimately, we want the readers of this and all reports we write to understand where the numbers and content within it are coming from - and be able to verify it independently.

The insights and analyses presented herein are based on our experience gained as an Ecosystem Actor for MakerDAO. While Steakhouse Financial endeavors to provide an objective and comprehensive overview, it is important for readers to be aware that our status as a paid Ecosystem Actor within the Maker Protocol may influence our views and interpretations.

If while reading through this report and the code of our queries you notice an error, please don't hesitate to contact us. We are lifelong learners and are eager to hear feedback from you. Thank you for reading and let's keep building!

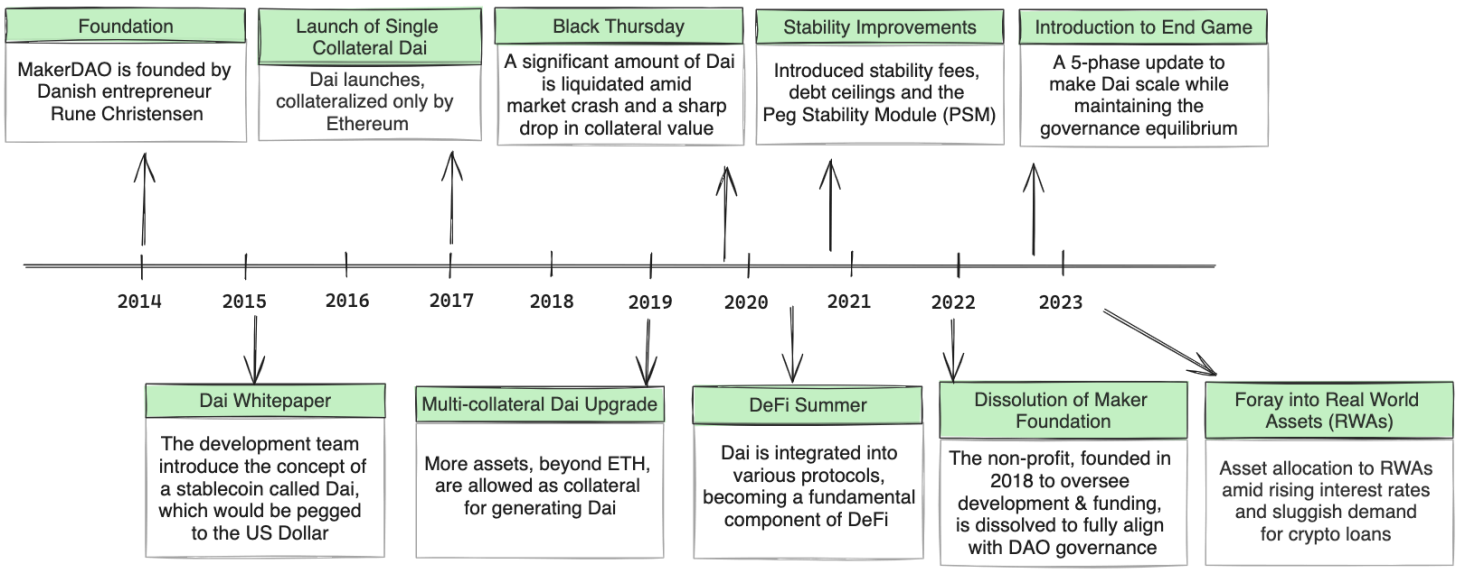
0.5. Definitions

- **ALM** means Asset Liability Management.
- **Arranger** means independent third parties that facilitate MakerDAO working with off-chain counterparties.
- **Aligned Voter Committee (AVC)** means organized groups of MKR token holders that publicly coordinate to analyze the optimal voting behavior based on a particular strategy when participating in Maker governance.
- **CDP** means Collateralized Debt Position
- **CeFi** means Centralized Finance.
- **CEX** means Centralized Exchange.
- **DAO** means Decentralized Autonomous Organization.
- **DeFi** means Decentralized Finance.
- **DEX** means Decentralized Exchange.
- **DSR** means Dai Savings Rate.
- **Ecosystem Actor** means external actors that are paid through the Scopes to do important work that benefit the MakerDAO ecosystem.
- **Impermanent Loss (IL)** is a temporary loss of funds that liquidity providers (LPs) experience when they provide funds to a liquidity pool in a decentralized exchange, and the price of assets in the pool changes.
- **Maker Governance** refers to the decentralized decision-making process that determines the rules, parameters and overall management of the Maker Protocol. Maker Governance is facilitated through the use of MKR tokens, which confer voting rights to their holders. The MKR holders make up the MakerDAO community.
- **MCD** means Multi-Collateral Dai.
- **MKR** means MakerDAO Governance Token.
- **NewBrandDAO (NBD)** means the to be announced new MakerDAO brand.
- **NewGovToken (NGT)** means the to be announced new MKR token.
- **NewStableToken (NST)** means the to be announced new Dai token.
- **Peg Stability Module (PSM)** is a special vault that allows users to swap other fiat-backed stablecoins directly for Dai at a 1:1 ratio.
- **Risk Parameters** are the specific settings and thresholds that govern the behavior and performance of the Maker Protocol. These parameters are crucial for managing the risks associated with maintaining the stability of the Dai stablecoin. Risk Parameters, voted on by the MKR token holders, include but are not limited to, the stability fee, liquidation ratio, debt ceiling, auction parameters and oracles.
- **RWA** means Real World Asset.
- **Smart Burn Engine** means a novel smart contract system designed to allocate excess Dai from the Surplus buffer that Maker is not using as contingency reserve.
- **Stability Fee** is the interest income generated by Maker, arising either from the interest rate that users pay to borrow Dai, or the yield derived from the Real World Asset (RWA) vaults.

- **TVL** means Total Value Locked.
- **Vault** means a smart contract running on the Ethereum blockchain which enables a user to lock collateral into it, and then hold that collateral until the borrowed Dai has been returned.

1. Protocol & DAO Overview

1.1. History



The Maker Protocol is a decentralized stablecoin project conceived in 2014 by Danish entrepreneur, Rune Christensen. Dai, Maker's decentralized stablecoin, is designed to offer stability against the U.S. dollar. Unlike fiat-backed stablecoins, Dai is backed by Collateralized Debt Position (CDPs), also known as Vaults. Users generate the Dai stablecoin by locking up their assets into the Vaults as collateral. These collateral assets serve as backing for Dai.

Dai first launched in 2017 as single-collateral Dai, wholly backed by user-deposited Ethereum (ETH). In 2019, the protocol upgraded to Multi-Collateral Dai (MCD), allowing Dai to be minted against a diverse range of collateral types, subject to approval by MKR token holders. The token holders also vote on corresponding Risk Parameters for each collateral asset.

Dai's resilience was tested during the turbulent events of March 12, 2020, widely known as "Black Thursday." On this day, the value of the collateral assets experienced a sharp decline, with ETH in particular falling over 40%. The rapid drop in collateral value impacted the collateralization ratio of outstanding Dai, triggering liquidations and challenging the peg stability. Certain system inadequacies and implementation vulnerabilities were identified, as summarized in the Black Thursday Compensation Analysis. The DAO responded to the event by implementing measures to fortify the stability of the protocol. Noteworthy enhancements included the creation of the Peg Stability Module (PSM), a specialized vault that enables users to exchange other governance-approved stablecoins for Dai. This functionality enables the market to capitalize on arbitrage opportunities, effectively mitigating deviations of Dai from its peg.

In 2021, the Maker Foundation announced its dissolution, moving to fully transfer the governance of the protocol to MKR holders. The Foundation was a non-profit organization, founded in 2018, to oversee the early development and funding of the Maker project. With the Foundation's dissolution, MakerDAO, as directed by MKR holders, became responsible for the governance of the Maker Protocol.

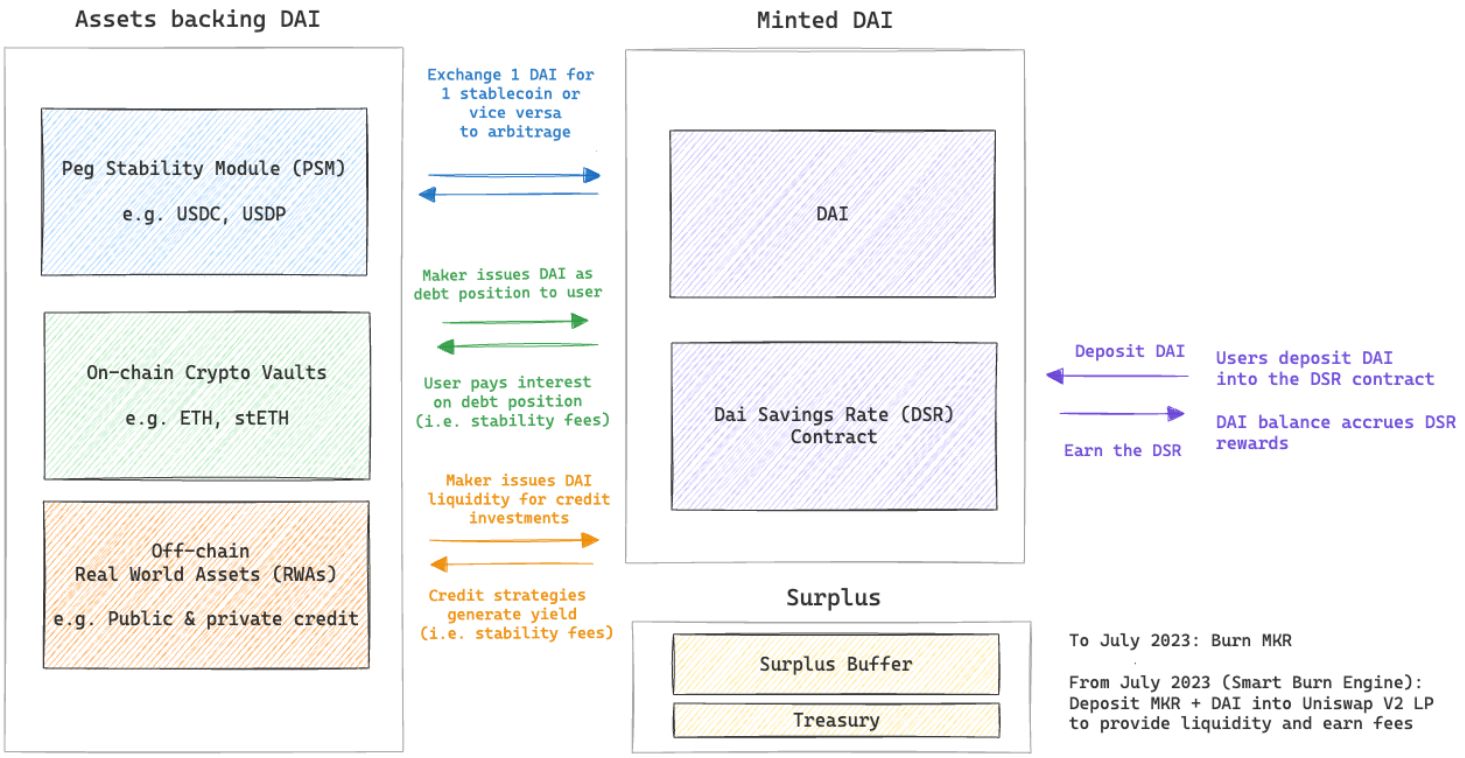
2022 marked the onset of a crypto bear market. Following notable bankruptcies in the industry, leverage in the crypto market unwound. This led to a reduction in demand for crypto-backed loans and by extension, crypto-backed Dai. To counter prevailing challenges, MakerDAO strategically turned to Real World Assets (RWAs), diversifying

Maker's collateral types beyond cryptocurrencies and stablecoins. In an environment of rising interest rates, the inclusion of RWAs significantly boosted Maker's fee generation.

With the successful navigation of multiple crypto cycles, MakerDAO is embarking on a multi-phase initiative to overhaul and improve the governance and tokenomics of the Maker ecosystem. The project, known as The Endgame Plan, was ratified by the MKR token holders and remains in active development.

1.2. Key Protocol Components

Maker is a decentralized system that enables users to permissionlessly mint the Dai stablecoin by issuing a debt position against their collateral. The protocol is made up of smart contracts that automate the Multi-collateral Dai (MCD) system.



There are two tokens associated with Maker.

- **MKR** tokens grant holders governance rights, enabling them to directly influence key decisions through a 1 token-1 vote mechanism. These decisions encompass setting risk parameters, adding new collateral types, and implementing system upgrades. The governance process involves proposal submission, community discussion, and secure blockchain-based voting. This structure ensures that MKR holders are incentivized to prioritize the protocol's stability and success, promoting governance decisions that are informed and advantageous for maintaining the protocol's health and adaptability.

- **Dai** stablecoin is a decentralized and collateral-backed cryptocurrency that is soft-pegged to the US Dollar. Each unit of Dai is backed by more collateral value than its "debt" (i.e. supply), and all transactions are publicly viewable on the Ethereum blockchain. Dai can be generated by depositing assets into Maker's Vaults, bought from brokers or exchanges, or received as payment.

  Dai holders can earn a reward on their holdings by locking their Dai into the Dai Savings Rate (DSR) contract. There is no minimum deposit required, and users can withdraw their Dai at any time. The DSR rate is determined by Maker Governance and can be adjusted based on market conditions. The funds to pay the DSR come from Maker's Stability Fees. The DSR also serves as a tool for balancing the supply and demand of Dai by incentivizing holding versus generating Dai. This helps stabilize the Dai peg by enabling Maker Governance to increase the rate if Dai is below peg (increase demand) or lower the rate if Dai is above peg (decrease demand).

MCD is backed by a range of collateral assets, which can be broadly categorized into three types: stablecoins, crypto assets and real world assets (RWAs). Each collateral asset has specific risk parameters, such as liquidation ratios and Stability Fees, which are determined by Maker Governance. Below are the key components of the protocol that are directly associated with collateral.

- **Vaults**, which are smart contracts that run on the Ethereum blockchain, enable a user to deposit collateral into them, and then hold that collateral until the borrowed Dai has been returned. Vaults are self-custodial and are owned by the Ethereum addresses that create them. They can be transferred between wallets freely, and there are typically no requirements for opening a vault for an Ethereum based collateral. vault owners must pay a stability fee on the generated Dai, which accrues in real time.
- **Peg Stability Module (PSM)** is a specialized vault that allows users to swap the stablecoin collateral directly for Dai at a fixed rate. The PSM functions with a 0% Stability Fee and a 1:1 collateralization ratio, meaning users swap assets directly for Dai at no cost. MakerDAO commits to a 1:1 swap ratio of USD to Dai through this module, facilitating arbitrage when Dai deviates from its peg to the dollar. The PSM helps maintain the Dai peg around $1, especially during times of imbalanced demand and supply for Dai. Governance can also collect fees on stablecoins during the swap.
- **Oracles** are critical data feeds that provide real-time price information of collateral assets to the blockchain, ensuring the stability and solvency of the Maker system. They serve to manage the inherent risks by enabling the protocol to maintain the collateralization ratios of Vaults. The decentralized and security-focused nature of these Oracles ensures that the system remains resistant to manipulation. By aggregating multiple data validators, the Oracles produce a consensus price that is integral to the protocol's operations, upholding Dai's value and platform integrity. The Oracle system is operated by Chronicle Labs.
- **Direct Deposit Modules (D3M)** enable the Maker Protocol to interact with lending protocols, such as Spark. "DssDirectDepositSparkDai" is a smart contract within this module, specifically designed for handling Dai tokens within Spark's lending pool. Its main objective is to ensure that the interest rate for borrowing Dai in Spark remains below a set target rate determined by Maker Governance. In Spark, the interest rate for a pool depends on its utilization, which is the ratio of borrowed funds to the total available liquidity. Higher utilization leads to higher interest rates, motivating liquidity providers to deposit capital when utilization is high. "DssDirectDepositSparkDai" aims to control the maximum variable interest rate in Spark's Dai pool by adjusting the Dai balance within the pool as needed. "DssDirectDepositSparkDai" continually monitors Spark's variable interest rate. When it's below the target, the contract withdraws liquidity from Spark, repays Dai debt in the Vault, and destroys the corresponding collateral. Any stability fees accrued in the Spark pool are transferred to the vow contract. (The vow represents the overall Maker Protocol's balance, both system surplus and system debt. The purpose of the vow is to cover deficits via debt auctions and discharge surpluses via surplus auctions). This mechanism helps keep the Dai interest rate in Spark within the desired range while maintaining a proper collateral balance.
- **Conduit System** is a smart contract that facilitates the deployment of funds to support reward-bearing strategies. In simple terms, the Conduit helps drive the system that enables SubDAOs to generate NST (Dai). Each Arranged Structure (legal structure) has a Conduit system that is automatically connected to all Allocator SubDAOs—the DAOs that manage the collateral assets that back NST. The Conduit system allows Allocator SubDAOs to draw funds from the Conduit and then send (allocate) them to SubDAOs.

For an additional layer of safety, MakerDAO maintains a reserve of Dai that serves as a cushion to cover potential losses and uphold the integrity of the Dai stablecoin system.

- **Surplus Buffer** is a reserve of Dai that the MakerDAO system accumulates over time. It acts as a financial safeguard, providing an added layer of safety against potential risks. The surplus is primarily sourced from the excess fees generated by the Maker Protocol (primarily via Stability Fees), net of operational expenses and the DSR expense.

1.3. How Maker Works

Maker's core functionality involves: A) facilitating the mint/burn of Dai stablecoins (collateralized debt positions) for Dai borrowers; B) maintaining the stability of Dai's value against the US dollar; and C) ensuring the solvency of the Dai stablecoin system.

A) Maker's lending activities are automated through smart contracts, which enable:

Dai issuance: Users mint Dai by locking up their collateral assets in Maker vaults. This action can be seen as a user initiating a Collateralized Debt Position (CDP) in Dai.

Debt repayment: Borrowers repay the debt (Dai), including Stability Fees, which generates income for Maker. Normal debt repayment involves a borrower repaying their loan with Dai and claiming back their collateral assets. Associated Dai is burnt and removed from circulation.

B) To maintain Dai's stability against the US dollar, Maker uses three key mechanisms:

Stability Fee is the interest that borrowers pay to borrow Dai. The fee accrues from the user initiation of the CDP and must be paid back to the protocol when the CDP is closed. The Stability Fee rate can be adjusted by MKR holders through governance voting to help steer Dai towards the peg.

- If Dai > $1, increasing the stability fee reduces Dai demand to nudge Dai's price down towards $1.
- If Dai < $1, decreasing the stability fee stimulates Dai demand to nudge Dai's price up towards $1.

Dai Savings Rate (DSR) is the interest Maker pays to users who lock up Dai in the DSR contract. The DSR can also be adjusted by MKR token holders to help steer Dai towards the peg (but in the opposite direction as the Stability Fee).

Peg Stability Module (PSM) allows users to swap fiat-backed stablecoins (e.g. USDC, USDP) for Dai at a 1:1 ratio, and vice versa. With PSM's functionality, any deviations of Dai from the peg presents an arbitrage opportunity for traders, who help to bring the price in line.

- If demand for Dai pushes the price > $1, arbitrageurs can deposit 1 USDC into the PSM to mint 1 Dai and sell the Dai in the open market for a profit. The minting of Dai (i.e. supply expansion) reduces the price closer to $1.
- Conversely, if Dai < $1, arbitrageurs purchase Dai in the open market, deposit it into the PSM and get 1 USDC for a profit. This action burns Dai (i.e. supply reduction), pulling up the price of Dai closer to $1.

In summary, MakerDAO uses rate-setting (Stability Fee and DSR) to adjust the supply and demand of Dai to help maintain the peg. The protocol also relies on arbitrageurs and the PSM to absorb Dai's short-term deviations from the peg.

C) To ensure the solvency of the Dai stablecoin system, Maker employs:

Liquidations: If the collateral value drops below the allowed threshold (liquidation ratio), the Maker Protocol triggers the liquidation process. The debt is then repaid through a collateral auction. Dai received from the auction is used to cover the Vault's outstanding obligations, including the Stability Fee and the liquidation penalty. Any leftover collateral is returned back to the Vault, which can be freely withdrawn by the user.

Surplus Buffer: If the collateral auction fails to raise enough Dai to cover the Vault's outstanding obligations, the deficit becomes the Maker Protocol's debt, which is repaid with the Dai in the Surplus Buffer.

MKR issuance: If there is not enough Dai in the Surplus Buffer, the protocol triggers a Debt Auction where new MKR tokens are minted and sold for Dai to cover the debt.

1.4. Protocol Value Generation

The Maker Protocol generates value primarily through demand for its user-generated stablecoin, Dai. Its income stream can be broadly grouped into the following three categories.

Net interest income: Stability Fees (i.e. the interest users pay to borrow Dai and the yield generated from allocation to real world assets), net of the Dai Savings Rate paid to the Dai savers.

Liquidation income: Fees paid by borrowers when their loans are liquidated, typically exceeding 10% of the loan value. These fees discourage liquidation and cover associated costs.

Trading fees: Generated from the PSM (currently set to 0), and more recently, from the Uniswap V2 Dai/MKR pool.

1.5. MakerDAO Governance

Wallets, Contracts, and Addresses

The Maker ecosystem is filled with hundreds of contracts, wallets, and significant addresses. These addresses can be found by navigating to the Change Log Github and all deployed active contract addresses on Mainnet and Goerli/Kovan testnets can be found here. To find a complete list of all active and related Maker ecosystem addresses simply scroll to the mainnet section and open the "active.json" file.

Maker Token Supply and Tokenomics

MakerDAO launched with an initial token supply of 1 million MKR tokens and the circulating supply at year end was 898K. The supply reduction was driven primarily by the transfer of 84,000 MKR tokens from the Maker Foundation to the DAO when it was dissolved, with the remaining either having been burned or held in the Uniswap V2 Dai/MKR LP. MKR holders possess governance rights, allowing them to vote on key protocol decisions, including fees, debt ceilings, and collateral ratios.

The protocol features a novel approach to manage systemic risks through the recapitalization function of the MKR token. In events where the system's debt overshadows its surplus, the protocol autonomously mints new MKR tokens. These tokens are subsequently auctioned for Dai, to address the financial imbalance and avert potential insolvency. This mechanism aligns the interests of MKR holders with the efficient governance of the system, promoting sound decision-making processes. This occurred during the infamous "Black Thursday" event on March 12, 2020. Triggered by a drastic drop in Ethereum prices, numerous lending positions in the MakerDAO system became undercollateralized. An emergent auction of newly minted MKR tokens was conducted, a first in the protocol's history, to manage the resulting protocol debt. Over 20,000 MKR tokens were minted and auctioned, successfully raising over 5.3 million Dai, thereby stabilizing the system.

On the other hand, when the Surplus Buffer is high due to accrued income, Maker activates the Smart Burn Engine mechanism. Historically, Maker would buy back and burn MKR tokens when the Surplus Buffer was above 50m Dai. In June 2023, MKR token holders passed a governance proposal to upgrade this mechanism to the Smart Burn Engine. Under the new system, MKR tokens are acquired directly from the Uniswap V2 Dai/MKR pool. These tokens, along with additional Dai sourced from the Surplus Buffer, are then supplied back to the same market. This mechanism essentially allocates the protocol surplus to progressively increase the on-chain liquidity for MKR over time. The Dai/MKR liquidity provider (LP) tokens generated from this process are transferred to a protocol-owned address. As an LP to the Dai/MKR pool, Maker is exposed to the Impermanent Loss (IL), but earns trading fees generated from the pool.

Fundraises and Major Tokenholders

MakerDAO's journey began with an initial distribution of its MKR tokens, setting the stage for its governance and operational model. The initial token distribution was allocated as follows:

- 69.50% to Founders & Project
- 15.00% to Team
- 15.50% to Investors

This distribution ensured that the core team and early contributors retained significant influence over the project's direction, while also allowing for external investment and community participation. Supplemental fundraising rounds have been critical in providing the necessary capital to develop and expand the platform. In December 2017, MakerDAO raised $12 million in a secondary token sale. This round was supported by prominent names like Andreessen Horowitz and Polychain Capital, alongside Distributed Capital Partners, Scanate, FBG Capital, Wyre Capital, Walden Bridge Capital, and 1Confirmation. The average price of MKR during this round was $300. Later In April 2019, the platform raised $15 million in another secondary token sale, this time funded by a16z Crypto, with an average MKR price of $250. In the same month of April 2019, MakerDAO secured an additional $27.5 million in a secondary token sale funded by Paradigm & Dragonfly Capital.

These rounds not only provided financial resources for MakerDAO's growth but also brought in strategic investors who would play a significant role in the platform's governance and development. Over time, the distribution of MKR tokens has shifted and changed drastically as some large stakeholders sold off or reduced positions and new individuals entered into the ecosystem.

Governance and Notable Votes

The governance process of MakerDAO is a critical aspect, as it empowers community members to participate in decision-making that affects the Maker Protocol and Dai. The voting process in MakerDAO is conducted on-chain, leveraging the Ethereum blockchain. MKR token holders participate in votes by locking their MKR tokens into the voting contract. This method ensures a secure, transparent, and immutable voting process. Votes are typically binary, allowing MKR holders to vote for or against proposals.

For a vote to be valid, it must meet specific quorum requirements. The quorum is the minimum number of MKR tokens that must participate in a vote for it to be considered valid. This threshold varies depending on the nature of the proposal and is designed to ensure that decisions reflect the consensus of a significant portion of the community.

To facilitate broader participation and streamline the governance process, MakerDAO introduced a delegate voting system. In this system, MKR holders can delegate their voting rights to chosen representatives, known as delegates. These delegates are typically well-informed community members or stakeholders with a vested interest in the protocol's health and success. Delegates are responsible for actively participating in governance discussions, reviewing proposals, and casting votes on behalf of their delegators. The DAO is currently undergoing another major evolution in its Governance processes through the Endgame Plan (see Section 5 below).

In 2023, many notable proposals received an affirmative vote from Maker Governance. Highlights include:

- Approval of the Maker Constitution: This was a major development in MakerDAO's governance. The community voted in favor of the Maker Constitution, a comprehensive set of rules outlining the future functioning and decision-making processes of MakerDAO. This constitution includes 11 constitutional articles and 12 scope frameworks. It was approved with 76% of voters in favor.
- Initiation of the 'Endgame' Plan: The approval of the Maker Constitution marked the beginning of the 'Endgame' era, a significant overhaul in how MakerDAO operates. The Endgame plan involves restructuring the DAO into smaller, self-governing and self-sustaining entities called SubDAOs, each with their own tokens.
- The Smart Burn Engine Upgrade: Contingent on the Surplus Buffer exceeding 50 million Dai, the protocol will use the buffer to buy MKR tokens to build an LP position in the Dai-MKR Uniswap V2 pool.
- Multi-Billion U.S. Treasury Purchase and More: Maker Governance also decided to purchase up to an additional $1.28 billion in U.S. Treasuries via a new real-world asset (RWA) vault named BlockTower

Andromeda. This vault is dedicated to deploying Maker's reserves into short-dated U.S. Treasury bonds. This decision followed an earlier purchase of $1.1 billion in U.S. Treasuries via a vault managed by Monetalis Clysdale. In 2023, these actions generated 44.5M Dai in Stability Fees.

1.6. Risk Factors

The risk factors presented herein represent what we consider to be the most relevant or pertinent risks, yet this list is not exhaustive, and there may be other risks not specifically identified.

Code vulnerabilities could compromise the normal functioning of the protocol

Smart contracts are susceptible to bugs and vulnerabilities. Any undiscovered flaw in Maker's code could be exploited by malicious actors, potentially leading to the manipulation of the protocol or compromised user funds.

Maker's technical risk mitigation strategies involve three aspects: Formal Verification, Third-Party Security Audits, and Bug Bounties.

Formal Verification is a process used to mathematically prove the correctness of a system. It involves applying mathematical techniques to analyze and verify that a program or system adheres to its specifications and behaves as intended. In smart contracts, formal verification is particularly important due to the irreversible and trustless nature of blockchain transactions. MakerDAO has leveraged various formal verification processes, including klab, KEVM and the K Framework, to enhance the resilience of the code against potential exploits.

Third-Party Security Audits have been conducted by reputable firms, including Trail of Bits, Peckshield and Runtime Verification. The various Maker Protocol audits are available in Maker's Github repository.

Bug Bounties are initiatives run by open-source projects to reward individuals who identify and responsibly disclose security vulnerabilities. They are a way for projects to harness the collective expertise of a wider community to identify and fix potential issues before they can be exploited maliciously. MakerDAO's bug bounty program for the protocol's critical infrastructure is currently live on the Immunefi platform.

These security measures provide a strong defense system for the protocol, though they are not infallible. In the context of code updates, continuous auditing and testing are crucial to mitigate smart contract risks.

Reliance on oracles for price feeds entails risk of unforeseen price errors

The Maker Protocol relies on oracles to determine the real-time value of collateral assets. Oracle price feed issues may lead to adverse consequences, including (but not limited to):

- Incorrect collateralization ratios.
- Unexpected liquidations and losses.
- Variations in the price of Dai.
- Loss of liquidity and stability in the protocol.
- Rapid rate adjustments.
- MKR dilution.

To mitigate oracle risks and increase robustness, Maker utilizes a decentralized oracle network, integrating multiple data sources.

Uneven distribution of voting power may threaten decentralized governance

Wherever governance structures rely on token-based voting mechanisms, there is a risk of concentration of voting power. Such concentration can result in a minority of participants wielding disproportionate influence over decision-making processes, potentially undermining the ethos of decentralization.

To address this challenge, the Maker community has taken proactive steps to align interests of all stakeholders and decentralize its governance. In March 2020, the Maker Foundation transferred the MKR token contract to community governance, marking the beginnings of the project's journey to reinstating decentralized governance. In May 2021,

the Maker Foundation returned 84,000 MKR of Dev Fund holdings to the DAO, with the formal dissolution of the Maker Foundation taking place shortly thereafter in July 2021. Today, Maker's governance and ecosystem growth efforts are aligned through the DAO. Maker leverages the voting powers of MKR token holders to govern various aspects of the protocol.

Despite these efforts, the risk remains that a small number of participants could control a significant portion of the voting power. This could deter community engagement, reduce transparency, and potentially leave the governance system vulnerable to manipulation.

Dai is subject to increasing competition from both centralized and decentralized stablecoins

With approximately $5 billion in circulating supply, Dai is the largest decentralized stablecoin. Historically, Dai's main competitors have been stablecoins issued by centralized entities, such as Circle (USDC) and Tether (USDT). However, there has been a growing number of DeFi protocols that have launched their own stablecoins in recent years. For instance, in 2023, Aave, a leading decentralized borrowing/lending protocol launched its own stablecoin GHO. Similarly, Curve, a leading stablecoin DEX, launched its native stablecoin crvUSD. Much like Dai, both GHO and crvUSD employ an overcollateralization strategy, although their market shares remain low. Maker benefits from an early mover advantage in the decentralized stablecoin sector. However, the emergence of new stablecoins with innovative features or improved efficiency could attract users and liquidity away from Dai.

Diversification of collateral types to centrally-issued or managed assets may increase counterparty risk

MakerDAO has over time diversified Dai collateral types from decentralized crypto assets to include off-chain 'real-world assets' (RWAs). While the expansion into RWAs has significantly increased protocol income, it has also increased allocation to centrally-issued or managed assets, raising the protocol's exposure to off-chain counterparties.

For instance, MakerDAO faces counterparty risk from holding USDC, a centralized stablecoin issued by Circle and currently held in Coinbase Custody. Any issues or disruptions with Circle or Coinbase could potentially lead to losses for MakerDAO. Managing and mitigating counterparty risk is a critical consideration for DAO governance.

MakerDAO faces legal and regulatory risks, including the possibility of government action or asset seizure

Regulatory frameworks for cryptocurrency, stablecoins and DeFi are constantly evolving. Consequently, there are uncertainties in how MakerDAO's assets and activities may be interpreted or scrutinized by governmental bodies. Further, the global nature of Dai's user base potentially exposes the protocol to diverse regulatory jurisdictions, each with its own set of compliance requirements. In extreme circumstances, unilateral government enforcement resulting in seizure of off-chain collateral could adversely affect the integrity of the protocol and the ability of MakerDAO to maintain Dai's tracking of the dollar.

Material changes in market conditions could negatively impact Maker's collateral value, fee generation or Dai's stability relative to the dollar

Maker's expansion into RWAs has increased exposure to the US yield curve. While the majority of its assets are highly liquid and concentrated on the short end of the curve, Maker's balance sheet and protocol income remain susceptible to market fluctuations. Key financial risks include:

Interest rate risk: Changes in the yield curve impact Maker's fixed income instruments. Rates and value are inversely correlated; a rate increase benefits protocol income but diminishes the value of fixed-income assets and consequently, the collateralization ratio. MakerDAO manages interest rate risk by focusing on short duration assets, which are less sensitive to interest rate changes.

Credit risk: Most of Maker's RWA exposure is in low-credit-risk assets, such as fiat-backed stablecoins and money market funds. However, a small portion (~5% of assets) is in private credit, which inherently carries higher credit risk. The DAO maintains a conservative limit on higher-yielding, higher-risk assets.

Liquidity risk: Maker's collateral is predominantly in highly liquid assets that can facilitate quick sales in the event of CDP liquidations. PSM reserves in fiat-backed stablecoins are assumed to be redeemable overnight, while

crypto-backed vaults and money market funds can take a week to a month. Diligent management and monitoring of liquidity risks are crucial for Dai's peg stability.

To mitigate financial risks, MakerDAO maintains a Surplus Buffer, which can absorb potential losses from market instability or collateral impairment. For a detailed overview and quantification of financial risks, please refer to the Asset-Liability Management section.

On-chain governance may encounter unforeseen difficulties when handling off-chain conflicts

Liquidations for crypto-collateral can be settled reasonably easily on-chain. However, liquidations for off-chain collateral present a source of uncertainty with respect to the ability of the protocol to rapidly enforce off-chain measures for maintaining collateral value.

Many of Maker's vaults are reliant on third-party servicers. Any events that compromise the ability of these servicers to fulfill their obligations could inhibit the DAO's ability to monitor and collect payments in relation to the RWA vaults.

The End Game is an ambitious and multi-stage strategy that carries execution risks

MakerDAO is embarking on a five-phase roadmap known as the "End Game." The goal of the End Game is to increase efficiency, resilience and participation of the Maker ecosystem through the creation of SubDAOs that take on the day-to-day coordination of innovation, adaptation and governance. This will require a non-trivial amount of experimentation and upgrades to the protocol, including but not limited to:

- An upgrade to new tokens codenamed 'NewStable' and 'NewGovToken.'
- A launch of multiple SubDAOs.
- Introduction of AI tools to maintain and interpret the Atlas, Maker's governance rulebook.
- Farming of new SubDAO tokens.
- Migration to a new blockchain that houses all of Maker's and its SubDAO's backend logic.

Successful implementation and operation of the SubDAOs is not guaranteed and unforeseen technical issues, vulnerabilities or smart contract bugs could compromise the integrity of the protocol.

A black swan event

A black swan event is a rare and critical surprise attack on a system. For the Maker Protocol, a non-exhaustive list of potential black swan events include:

- An attack on the collateral assets that back Dai.
- A large, unexpected price decrease of one or more collateral assets.
- A highly coordinated Oracle attack.
- A malicious Maker Governance proposal.

While no one solution is failsafe, the careful design of the Maker Protocol (Liquidation Ratio, Debt Ceilings, the Governance Security Module, the Oracle Security Module, Emergency Shutdown, etc.) in conjunction with swift and thoughtful governance could help to prevent or mitigate potentially severe consequences of an attack.

Maker Governance incentivizes a large capital pool to act as market Keepers to maximize rationality and market efficiency, and allow the Dai supply to grow steadily without major market shocks. As a last resort, Emergency Shutdown can be triggered to release collateral assets to Dai holders, with their Dai claims valued at the Target Price.

General Issues with Experimental Technology

Users of the Maker Protocol (including but not limited to Dai and MKR holders) understand and accept that the software, technology, and technical concepts and theories applicable to the Maker Protocol are still unproven and there is no guarantee that the technology will be uninterrupted or error-free. There is an inherent risk that the technology could contain weaknesses, vulnerabilities, or bugs causing, among other things, the complete failure of the Maker Protocol and/or its component parts.

2. 2023 Operating Results for the Maker Protocol

2.1. Executive Summary

2023 was a transformative year for the Maker Protocol in many ways. Most notably, Maker onboarded and ramped up two real world asset (RWA) vaults - Clydesdale and Andromeda - which deployed protocol capital into short duration US treasuries. These allocations increased the sustainability of the Maker Protocol, as it no longer has to solely rely on the crypto lending market, which is highly cyclical. Rebounding from the Q4 2022 nadir of annualized stability fee of 11.3 million Dai, the protocol exited 2023 in a significantly stronger position, with 222.2 million Dai in gross annualized protocol revenue.

In 2023, the Maker Protocol saw:

- Gross stability fee revenue of 107.7 million Dai, an increase of 140% (+62.7 million) from the prior year.
- RWA and PSM vault Stability Fees increase 43x vs 2022, from 1.5 million to 64.9 million Dai, making up 60% of total protocol Stability Fees.
- Liquidation revenue of 0.4 million Dai, a 98% decrease (28.4 million) from 2022.
- Total Dai supply increased slightly, by 1.6%, from 5.14 billion to 5.22 billion.
- The DSR was increased above 1 basis point for the first time since March 2020, resulting in 1.47 billion Dai locked in the DSR at year end and 32.7 million Dai distributed from the protocol for the year.
- A 15.6% increase in net protocol earnings, from 18.8 million to 21.7 million Dai, inclusive of MKR token expenses.
- RWA vault balances increased 282%, from 640 million Dai to 2.44 billion Dai, driven by an increase of 1.68 billion Dai allocated into vaults which deployed into short duration US Treasuries.
- Crypto vault balances increased 81%, from 1.3 billion to 2.4 billion Dai, driven by a 189% increase in stETH Vaults (214 million to 618 million Dai in 2023).
- MKR burns and Dai/MKR LP purchases increased roughly 3x from 2022, from 20.1 million Dai to 59.6 million Dai.

2.2. 2023 Financial Statements

- Net protocol operating earnings of 21.7 million Dai (+15.6% YoY) on total protocol revenues of 75.5 million Dai (+16.1% YoY), inclusive of MKR token expenses.
- The DSR was increased above 1 basis point for the first time since March 2020, resulting in 1.46 billion in Dai locked in the DSR at year end.
- Average earning assets more than doubled, from 2.45 billion to 4.96 billion Dai (+103% YoY).
- RWA collateral increased from 640 million Dai to 2.4 billion Dai, crypto Vaults also increased from 1.3 billion Dai to 2.4 billion Dai.
- Change in protocol surplus of (22.5 million) Dai, largely due to the introduction of the new protocol owned liquidity program, the Smart Burn Engine.

	Year ended December				
in millions of Dai, unless otherwise stated	2020	2021	2022	**2023**	YoY
Consolidated Statement of Earnings					
Revenues					
Non-stability fee revenue	(5.2)	25.0	28.8	**0.5**	-98.3%
Stability fee revenue	8.9	87.3	36.2	**75.0**	107.2%
Total net protocol revenues	3.7	112.4	65.0	**75.5**	16.1%
Total operating expenses	-	(22.2)	(46.2)	**(53.7)**	NM
Net Operating Earnings	3.7	90.2	18.8	**21.7**	15.6%
Consolidated Balance Sheets					
Assets					
Crypto-vaults	1,169.5	5,419.1	1,315.4	**2,380.4**	81.0%
PSM	0.0	3,661.9	3,183.9	**400.5**	-87.4%
RWA	-	17.0	639.6	**2,440.0**	281.5%
Total CDP	1,169.5	9,098.0	5,138.9	**5,221.0**	1.6%
Treasury holdings	-	1.8	0.6	**0.7**	12.2%
Total Assets	**1,169.5**	**9,099.8**	**5,139.5**	**5,221.6**	1.6%
Liabilities					
Dai Locked in DSR	4.5	91.2	2.0	**1,465.9**	72928.5%
Circulating Dai	1,161.0	8,942.4	5,062.0	**3,702.6**	-26.9%
Total Liabilities	**1,165.5**	**9,033.5**	**5,064.0**	**5,168.6**	2.1%
Equity					
Surplus Buffer	4.0	64.5	74.9	**52.4**	-30.0%
Treasury holdings	-	1.8	0.6	**0.7**	12.2%
Total Equity	**4.0**	**66.3**	**75.4**	**53.0**	-29.7%

Statement of Changes in Protocol Capital					
Net Operating Earnings	**3.7**	90.2	18.8	**21.7**	15.6%
Other changes in Surplus Buffer	0.1	(29.8)	(8.4)	**(44.2)**	NM
Net Change in Surplus Buffer	**3.8**	60.5	10.4	**(22.5)**	NM
Other changes in protocol capital	-	1.8	(1.2)	0.1	NM
Net Change in Protocol Capital	**3.8**	**62.3**	**9.2**	**(22.4)**	NM

Ratios & per token metrics

Value per token					
Average MKR tokens outstanding (000s)	1,004	937	899	**907**	0.8%
Net operating earnings per token (Dai/token)	3.68	96.32	20.92	**23.99**	14.6%
Book value per token (Dai/token)	3.99	70.75	83.90	**58.51**	-30.3%
Average earning assets (Dai/token)	1,169.5	5,436.1	2,448.2	**4,960.5**	102.6%
Closing price (Dai/token)	583	2,336	511	**1,700**	232.7%
Market capitalization	586	2,188	459	**1,541**	235.5%
Key Ratios					
Price to Book	146.2x	33.0x	6.1x	**29.1x**	377.1%
Price to Earnings	158.6x	24.3x	24.4x	**70.9x**	
Net Interest Margin	0.76%	1.61%	1.48%	**1.51%**	2.3%
Net Interest Spread	-16.16%	1.60%	1.64%	**-0.06%**	NM
Return on Assets	NM	1.76%	0.37%	**0.43%**	15.8%
Return on Equity	NM	256.76%	29.57%	**34.76%**	17.6%
Growth in Book Value per token		1673.9%	18.6%	**-30.3%**	NM

Source: Steakhouse Financial Accounting Dashboard for MakerDAO, Dune queries. Note: ROA and ROE calculated on an average basis.

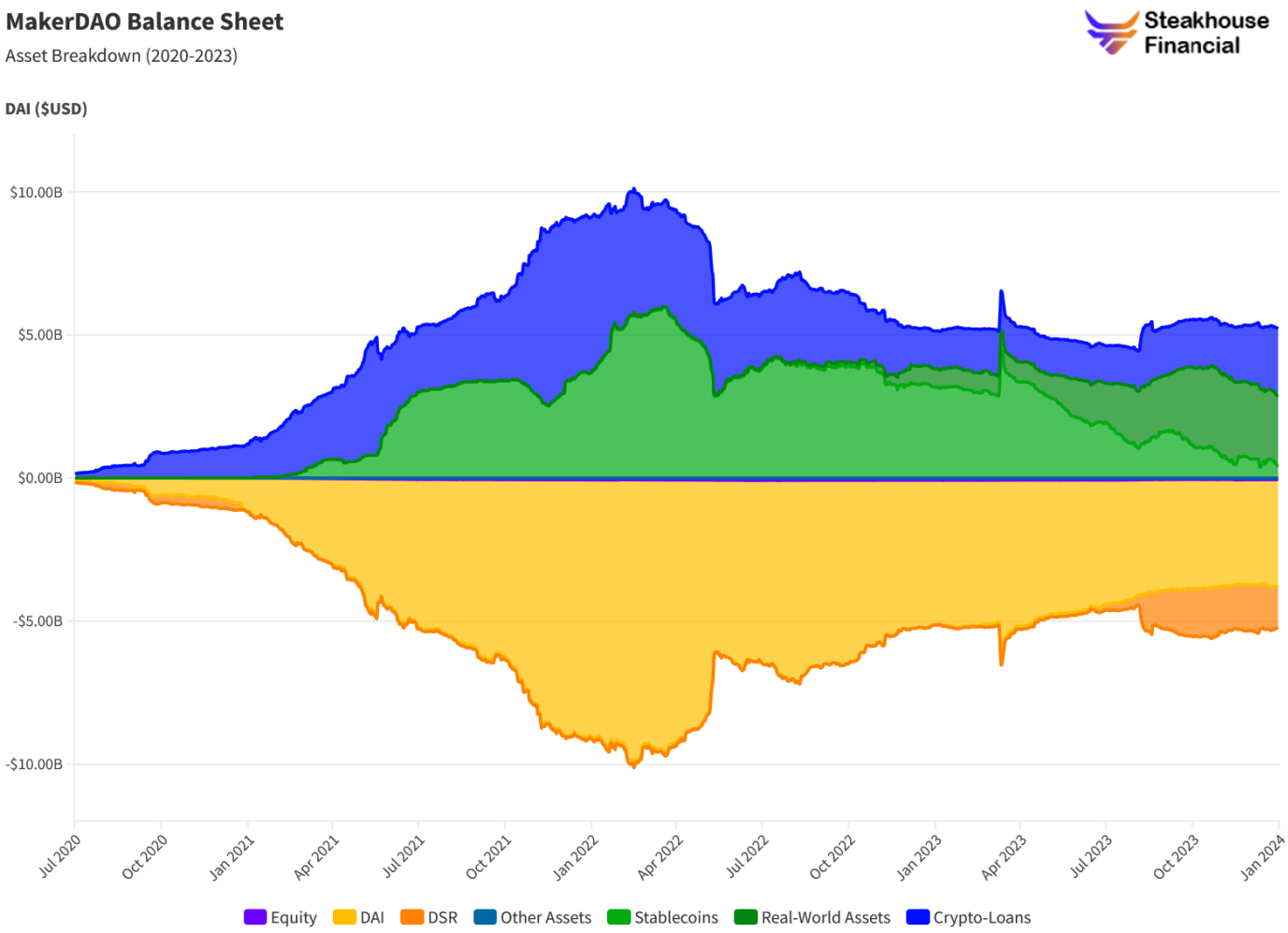
in millions of Dai, unless otherwise stated	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***2023***
Consolidated Statement of Earnings													
Revenues													
Net trading fees	0.0	0.0	0.1	0.0	0.0	0.0	-	-	-	-	-	-	**0.1**
Net liquidation income	-	0.0	0.0	-	0.0	0.1	0.0	0.2	0.0	-	0.0	-	**0.4**
Total non-interest revenues	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	-	0.0	-	**0.5**
ETH	0.6	0.5	0.6	0.6	0.7	1.0	1.5	1.6	1.6	2.1	2.4	3.0	**16.2**
STETH	0.2	0.2	0.4	0.3	0.4	0.9	1.6	2.5	2.5	2.5	2.5	2.7	**16.7**
BTC	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.5	**3.6**
Liquidity Pool	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	-	-	**0.1**
Money Market	0.0	0.0	0.0	-	-	0.0	-	0.4	0.8	0.8	1.6	2.4	**6.0**
Other	0.0	0.0	0.2	0.0	0.0	-	-	-	-	-	-	-	**0.2**
PSM	0.5	0.6	0.6	0.5	-	1.4	-	1.1	2.1	5.5	3.4	0.3	**16.0**
RWA	0.1	0.2	0.4	1.5	0.3	0.6	0.4	9.4	2.3	8.9	19.3	5.4	**48.9**
Stablecoins	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Gross interest revenues	1.5	1.7	2.2	3.0	1.8	4.3	3.8	15.4	9.8	20.2	29.7	14.3	**107.7**
DSR	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.2)	(0.8)	(5.5)	(6.0)	(7.0)	(6.4)	(6.5)	**(32.7)**
Oracle gas expenses	-	-	-	-	-	-	-	-	-	-	-	-	**-**
RWA-related monitoring and setup costs	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Direct expenses	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.2)	(0.8)	(5.5)	(6.0)	(7.0)	(6.4)	(6.5)	**(32.7)**
Net interest income	1.5	1.7	2.1	3.0	1.7	4.0	3.1	9.9	3.7	13.2	23.3	7.8	**75.0**
Total net revenues	1.5	1.7	2.2	3.0	1.7	4.1	3.1	10.1	3.7	13.2	23.3	7.8	**75.5**
Accumulated sin from crypto-vaults	-	(0.0)	(0.0)	-	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	-	(0.0)	-	**(0.0)**
Operating expenses													
Direct to Third Party Expenses	(0.2)	(0.3)	(0.2)	(0.9)	(1.8)	(0.7)	(2.5)	(3.5)	(1.5)	(2.8)	(3.4)	(2.5)	**(20.1)**
Keeper Maintenance	-	-	-	-	(0.0)	(0.1)	(0.1)	(0.1)	(0.0)	(0.0)	(0.1)	(0.1)	**(0.4)**
Workforce Expenses	(1.8)	(2.1)	(4.2)	(3.5)	(2.0)	(0.6)	(1.5)	(1.4)	(0.1)	(1.1)	0.5	(0.1)	**(17.8)**
MKR token expenses	(1.2)	(0.3)	(1.2)	(0.8)	(1.0)	(0.8)	(1.5)	(1.4)	(0.9)	(2.4)	(1.7)	(2.3)	**(15.4)**
Total operating expenses	(3.2)	(2.7)	(5.6)	(5.2)	(4.8)	(2.1)	(5.5)	(6.4)	(2.5)	(6.3)	(4.7)	(4.9)	**(53.7)**
Net Operating Earnings	**(1.6)**	**(1.0)**	**(3.4)**	**(2.2)**	**(3.0)**	**2.0**	**(2.5)**	**3.7**	**1.3**	**7.0**	**18.6**	**2.9**	**21.7**

in millions of Dai, unless otherwise stated	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***2023***
Consolidated Balance Sheets													
Assets													
ETH	590	602	584	589	558	537	503	587	574	576	597	783	**783**
STETH	284	348	359	370	486	481	575	647	620	576	678	618	**618**
BTC	80	87	86	109	96	88	77	77	74	84	96	113	**113**
Liquidity Pool	459	453	190	190	184	184	184	181	181	176	170	160	**160**
Money Market	20	35	-	-	5	20	20	200	210	272	474	707	**707**
Other	22	25	8	4	0	0	0	0	0	0	0	0	**0**
Crypto vaults	1,456	1,550	1,228	1,263	1,329	1,310	1,358	1,692	1,659	1,685	2,014	2,380	**2,380**
PSM (Earning)	489	478	306	408	1,000	1,000	799	745	742	360	287	140	**140**
PSM (Non-Earning)	2,599	2,488	3,050	2,461	1,125	953	440	869	428	412	420	260	**260**
Total PSM	3,088	2,966	3,357	2,869	2,125	1,953	1,240	1,614	1,170	772	707	400	**400**
Private Credit RWA	181	196	199	214	218	225	239	250	253	259	257	263	**263**
Public Credit RWA	500	500	500	562	1,122	1,142	1,742	1,717	2,452	2,630	2,365	2,177	**2,177**
Total RWA vaults	681	696	699	776	1,341	1,368	1,982	1,967	2,705	2,889	2,622	2,440	**2,440**
Vault book	5,225	5,212	5,284	4,908	4,794	4,630	4,579	5,273	5,534	5,346	5,344	5,221	**5,221**
Net change in treasury tokens	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	**2.2**
Acc. mark-to-market change in value	(1.3)	(1.4)	(1.4)	(1.5)	(1.6)	(1.6)	(1.6)	(1.7)	(1.7)	(1.7)	(1.6)	(1.6)	**(1.6)**
Treasury holdings	0.9	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.7	**0.7**
Total Assets	**5,226**	**5,213**	**5,285**	**4,909**	**4,795**	**4,631**	**4,580**	**5,273**	**5,535**	**5,346**	**5,344**	**5,222**	**5,222**
Liabilities													
Interest bearing Dai (DSR)	35.8	107.8	109.5	96.6	100.7	207.6	343.6	1,317.7	1,656.6	1,547.1	1,619.3	1,465.9	**1,465.9**
Non-interest bearing Dai (Circulating)	5,115	5,031	5,103	4,741	4,625	4,352	4,172	3,902	3,828	3,749	3,666	3,703	**3,703**
Total Liabilities	**5,151**	**5,139**	**5,213**	**4,838**	**4,726**	**4,560**	**4,516**	**5,219**	**5,484**	**5,296**	**5,286**	**5,169**	**5,169**
Equity													
Surplus Buffer	74.4	73.7	71.6	70.1	68.1	70.9	63.7	53.4	49.9	49.6	58.2	52.4	**52.4**
Treasury holdings	0.9	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.7	**0.7**
Total Equity	**75.3**	**74.6**	**72.3**	**70.8**	**68.7**	**71.5**	**64.3**	**53.9**	**50.4**	**50.1**	**58.7**	**53.0**	**53.0**

in millions of Dai, unless otherwise stated	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***2023***
Statement of Changes in Protocol Capital													
Net Operating Earnings	**(1.6)**	**(1.0)**	**(3.4)**	**(2.2)**	**(3.0)**	**2.0**	**(2.5)**	**3.7**	**1.3**	**7.0**	**18.6**	**2.9**	**21.7**
Issuance for MKR token expenses	1.2	0.3	1.2	0.8	1.0	0.8	1.5	1.4	0.9	2.4	1.7	2.3	**15.4**
MKR mints/(burns)	-	-	-	-	-	-	(6.3)	(15.4)	(5.7)	(9.7)	(11.7)	(10.9)	**(59.6)**
Net Change in Surplus Buffer	**(0.5)**	**(0.7)**	**(2.2)**	**(1.4)**	**(2.0)**	**2.8**	**(7.2)**	**(10.3)**	**(3.5)**	**(0.3)**	**8.6**	**(5.8)**	**(22.5)**
Treasury asset income	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-	**0.0**
Treasury asset chg value	0.3	(0.0)	(0.1)	(0.1)	(0.1)	(0.0)	0.0	(0.1)	0.0	0.0	0.1	0.1	**0.0**
Other changes in protocol capital	0.3	(0.0)	(0.1)	(0.1)	(0.1)	(0.0)	0.0	(0.1)	0.0	0.0	0.1	0.1	**0.1**
Net Change in Protocol Capital	**(0.2)**	**(0.7)**	**(2.3)**	**(1.5)**	**(2.1)**	**2.8**	**(7.2)**	**(10.4)**	**(3.5)**	**(0.3)**	**8.6**	**(5.7)**	**(22.4)**

Source: Steakhouse Financial Accounting Dashboard for MakerDAO, Dune queries

2.3. Discussion & Analysis of the Balance Sheet



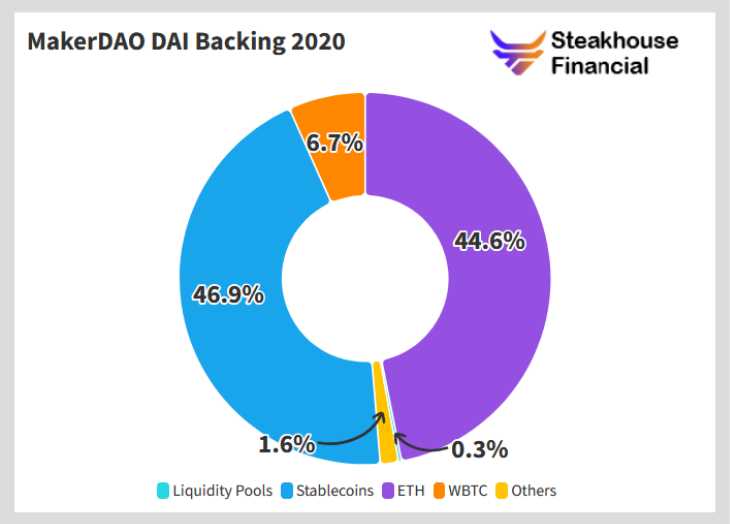
The above diagram illustrates the progression of Maker's balance sheet over time. Mirroring the fluctuations in the cryptocurrency market cycle, the supply of Dai experienced substantial growth, rising from 1.2 billion Dai at the end of 2020 to 9 billion in 2021, before declining to 5.1 billion in 2022 and subsequently recovering to 5.2 billion in 2023.

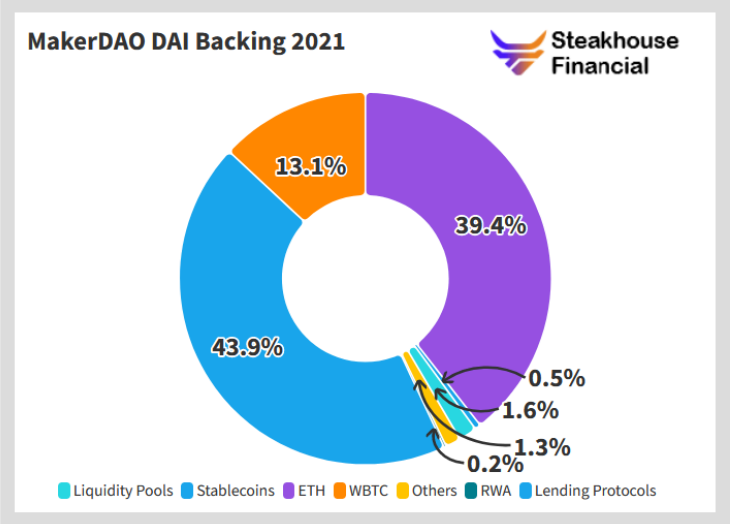
2.3.1. Dai Backing

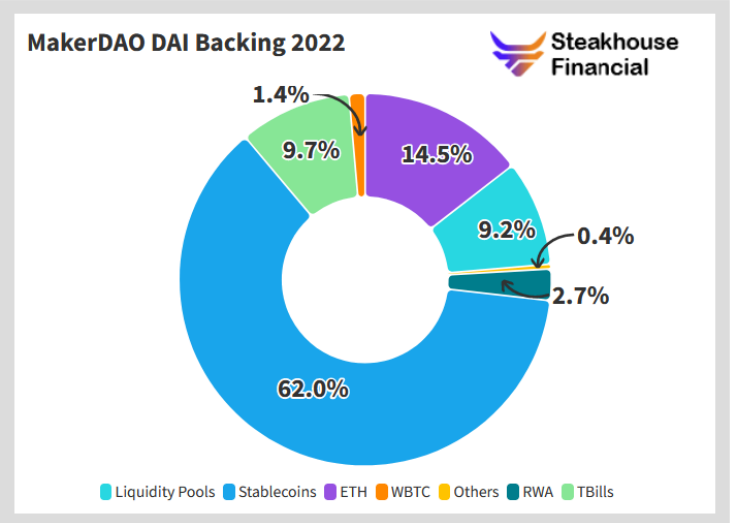
Prior to 2022, the majority of Dai was backed by crypto collateral and stablecoins, primarily ETH and USDC. The large stablecoin backing traced its roots to early 2020, when Dai began consistently trading above the peg as the demand for the decentralized stablecoin exceeded the supply provided by the market's appetite for leverage on digital assets. Ultimately, the peg was stabilized with the launch of Peg Stability Modules ("PSM"), which are specialized vaults that allow users to swap other fiat-backed stablecoins directly for Dai at a 1:1 ratio.

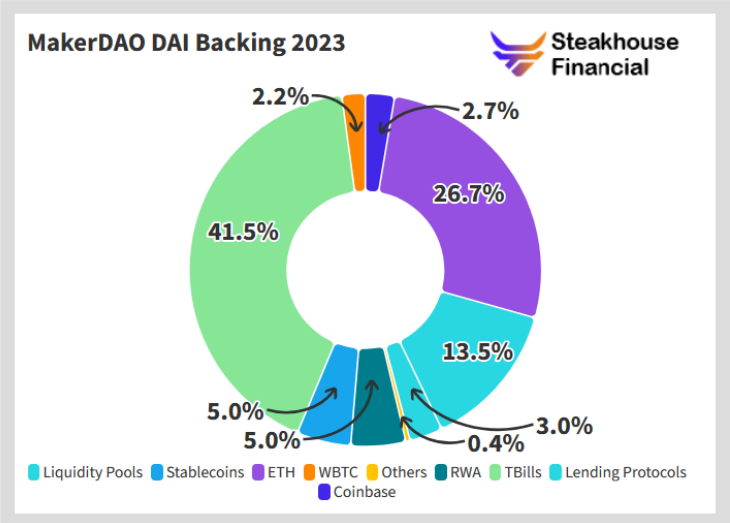
While the PSMs provided much needed stability to the Dai peg, the billions of stablecoins held in those vaults were not producing Stability Fees for the protocol. In 2021, MakerDAO embarked on its initiative to allocate the unproductive assets towards yielding real world assets (RWAs). That year, five RWA vaults were launched. They provided financing for real estate, trade finance, and SMBs. While these vaults ultimately did not constitute a large portion of Dai's collateral, they represented important stepping stones to efficiently connect the off-chain and on-chain worlds, giving the MakerDAO ecosystem access to a far wider variety of collateral.

By July 2022, shrinking demand for crypto collateral loans resulted in a record level of Dai backing being in stablecoins at 85% of total assets. Critics called Dai "wrapped USDC." Despite USDC's own collateral being invested in yielding instruments, such as money market funds, treasuries or overnight reverse repurchase agreements, this yield was not passed on to USDC holders, including Maker. In a non-zero interest rate environment, it became logical for Maker to directly expose itself to USDC's underlying collateral, as this would generate revenue for the protocol.









Steakhouse's ALM research and modeling of Dai user activity had suggested that the Maker's balance sheet was significantly underallocated to productive (yield-generating) assets. In February 2022, the MakerDAO community's desire for exposure to U.S. Treasury Bills was signified by a declaration of intent. The approved proposal led to the onboarding of the first arranger and arranger vault, Monetalis Clydesdale in October 2022.

Arrangers are independent third parties that facilitate MakerDAO working with off-chain counterparties. The second arranger, BlockTower Credit, was introduced in July 2022 and its arranger vault, Andromeda was onboarded in June 2023. These arranger vaults allowed MakerDAO to deploy its excess PSM reserves into U.S. Treasury Bills. Consequently, the percentage of RWAs backing Dai grew from 12% in 2022 to 47% in 2023, nearly a 4x increase. In nominal terms, RWA exposure increased from 640 million Dai to 2.4 billion Dai over the same period, a 282% increase.

The following sections dive deeper into each of Maker's collateral types.

2.3.2. Crypto Vaults

Collateral	2020	2021	2022	2023	vs '22	vs '21	vs '20
ETH	548.0	3,533.2	532.6	**782.7**	47%	-78%	43%
STETH	-	52.8	213.7	**618.1**	189%	1071%	N/M
BTC	78.2	1,193.3	71.5	**112.9**	58%	-91%	44%
Liquidity Pool	3.0	143.9	471.1	**159.7**	-66%	11%	5223%
Money Market	-	47.1	5.0	**707.1**	14042%	1401%	N/M
Other	540.3	448.8	21.5	**0.0**	-100%	-100%	-100%
Crypto vaults	**1,169.5**	**5,419.1**	**1,315.4**	**2,380.4**	**81%**	**-56%**	**104%**

Over the years, the composition of crypto vaults backing Dai has evolved from its historical concentration on Ethereum (ETH) and Bitcoin (BTC).

A notable trend observed in 2023 was the growth of staked Ethereum (stETH) vaults. stETH collateral increased from 214M Dai at year end 2022 to 618M to close 2023 (+189%). This growth outpaced the percentage increase in vanilla Ethereum collateral over the same period, which rose from 533 million Dai to 783 million Dai (+47%). During 2023, stETH briefly surpassed ETH as the most popular crypto collateral in Maker. stETH holds its appeal due to its embedded Ethereum staking rewards. We anticipate that the trend of relative growth in stETH will persist into 2024.

"Money Market" collateral also witnessed significant growth. This pertains to direct deposits into Spark. Spark is the first SubDAO launched through Maker's Endgame plan and has been off to an undeniably strong start. It is a fork of Aave v3, powered by Maker's Direct Deposit Module ("D3M"), which enables users to borrow multiple assets (not just Dai) with multiple collateral assets. Spark was one of the fastest growing DeFi protocols in 2023; since its launch in May, it has accumulated $2.78B in deposits and $1.03B in Borrows as of December 31st, 2023. The 707 million Dai of "Money Market" collateral in 2023 relate to the crypto collateral backing borrowed Dai through Spark, which stood at $681 million Dai at the end of 2023.

Spark's money market protocol model offers several benefits to users. First, it enables Maker, through Spark, to be able to access the peer to peer lending market. Second, it provides enhanced flexibility, catering to the preferences of users who seek to collateralize and manage their borrowing with multiple assets.

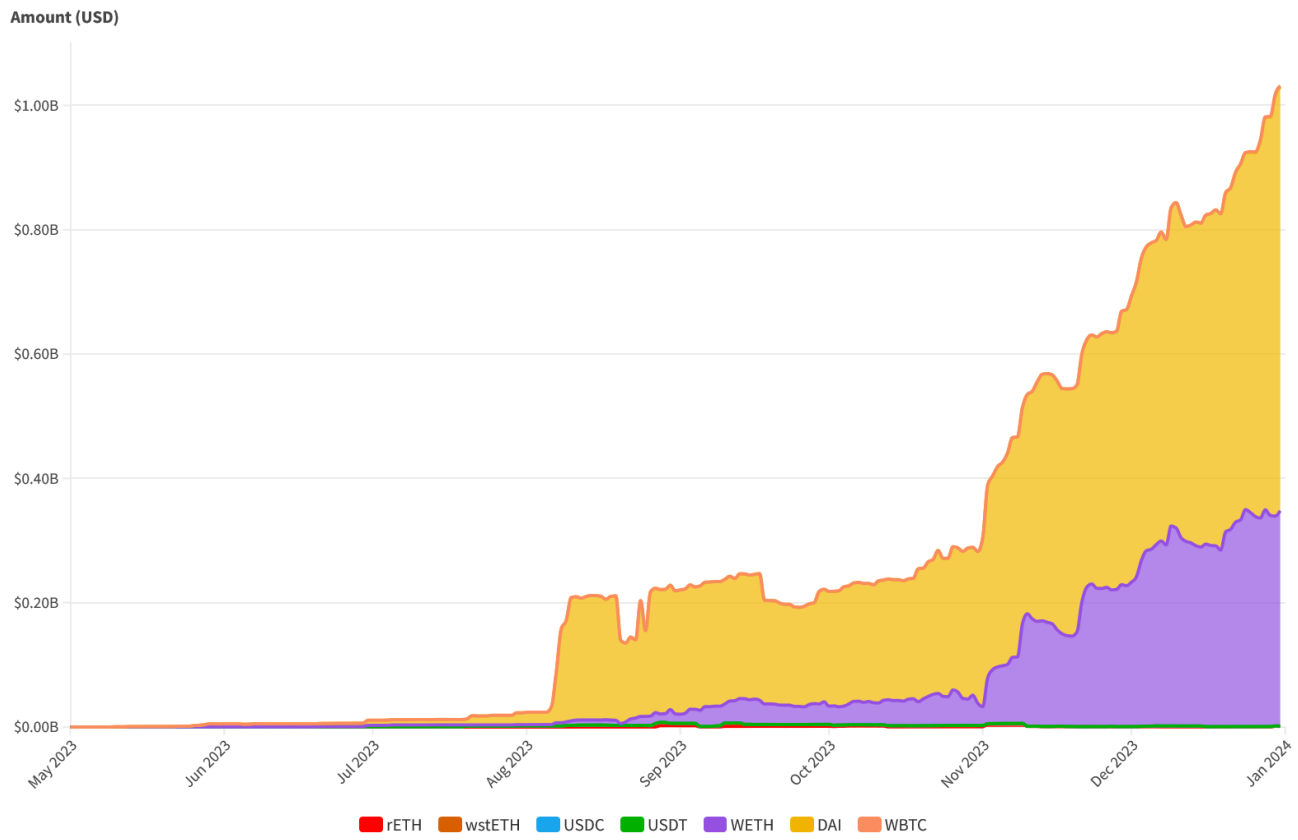
Second, Spark's cross-collateralization feature presents a diversification benefit, mitigating the risk of collateral liquidation during periods of heightened market volatility, especially when the assets are not highly positively correlated. Admittedly, crypto assets exhibit a high correlation today. However, correlation could decrease over time as various use cases and verticals develop with different end market dynamics.

Third, Spark expands Maker's exposure to the borrowing markets of other cryptocurrencies beyond Dai.

The adoption of Spark has likely been bolstered by the pre-farming airdrop announced in August. This airdrop represents only a fraction of the tokens and value that will be distributed through the SubDAO launch.

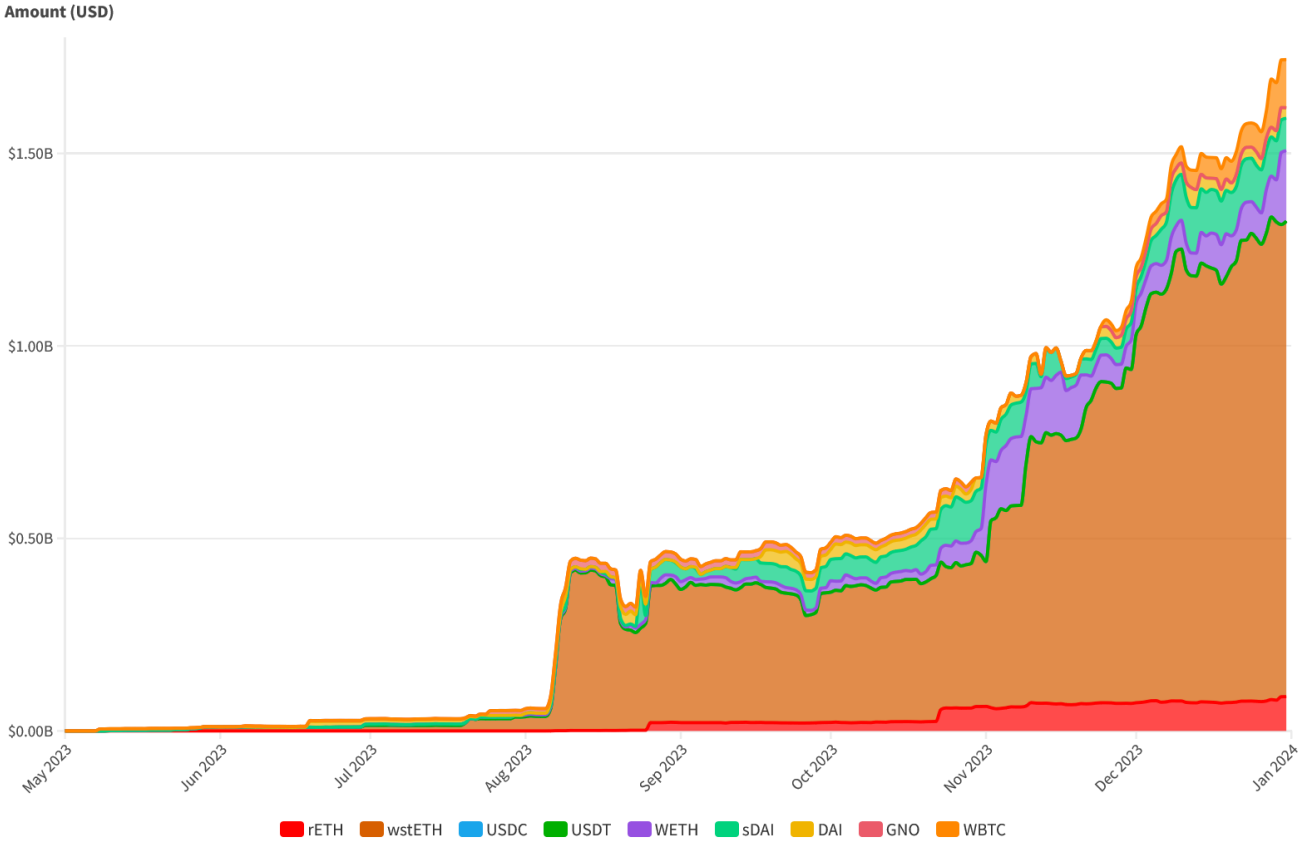
Spark Borrow Total Value Locked

Market Breakdown (2023)



Spark Supply Total Value Locked

Market Breakdown (2023)



2.3.3. Real World Asset Vaults

As of the end of 2023, Maker's RWA program supported more than 2.5 billion Dai and generated over 75 million in Stability Fees for the protocol. RWA vaults can be categorized into public credit and private credit. A summary of each RWA vault is provided below. Ongoing risk monitoring and reporting for these vaults is available from Steakhouse on the MakerDAO forums.

2.3.4. Public Credit

Monetalis Clydesdale: US Treasuries

The Monetalis Clydesdale transaction is a 1.11 billion Dai vault collateralized by short-term United States Treasuries, allocated uniformly to treasury bills with terms between zero and six months. The transaction is structured through James Asset (PTC) Limited, a private trust company established in the British Virgin Islands in 2022. James Asset (PTC) Limited and its subsidiary trusts have arrangements with a number of service providers to facilitate the purchases, sales, and custody of these treasuries, namely 1) Monetalis as Arranger and reporting agent, 2) SHRM Group as trustee, 3) Coinbase as Exchange Agent, and 4) Bank Sygnum as banking partner and custodian.

The vault was brought on-chain in October of 2022 with an initial mandate to purchase treasury bond ETFs. In addition to the ETFs, Clydesdale began purchasing T-bills directly in May of 2023. In October of 2023, Clydesdale converted its remaining ETF position to direct T-bill ownership. Although the current debt ceiling is set to 3 billion Dai, the amount of Dai drawn from the vault and used to purchase treasuries is calculated based on the liquidity provisions outlined in MIP104: Stability Scope Bounded Mutable Alignment Artifact. In coordination with BlockTower Andromeda, the Clydesdale treasury portfolio is rebalanced with additional purchases or sales whenever the protocol's liquidity deviates from those parameters. Interest generated from treasury bills is returned to the protocol on a bi-weekly basis. As of 2023 year-end, Clydesdale has generated 34 million in net interest proceeds and returned 23 million back to the protocol.

BlockTower Andromeda: US Treasuries

The BlockTower Andromeda transaction is a 1.07 billion Dai vault collateralized by short-term United States Treasuries, allocated uniformly to treasury bills with terms between zero and six months. The transaction is structured through the TACO foundation, a foundation company incorporated in the Cayman Islands in 2022. TACO Foundation has arrangements with a number of service providers to facilitate the purchases, sales, and custody of these treasuries, namely 1) BlockTower as Arranger and Asset Manager, 2) Ankura as Paying Agent, 3) Coinbase and Galaxy as Exchange Agents, and 4) ComputerShare, StoneX, Axos Bank, and Customers Bank as banking partners and custodians.

The vault was brought on-chain in June of 2023 and began purchasing T-bills the same month. Although the current debt ceiling is set to 3 billion Dai, the amount of Dai drawn from the vault and used to purchase treasuries is calculated based on the liquidity provisions outlined in MIP104: Stability Scope Bounded Mutable Alignment Artifact. In coordination with Monetalis Clydesdale, the Andromeda treasury portfolio is rebalanced with additional purchases or sales whenever the protocol's liquidity deviates from those parameters. Interest generated from treasury bills is returned to the protocol on a bi-weekly basis. As of 2023 year-end, Andromeda has generated 24 million in net interest proceeds and returned 22 million back to the protocol.

2.3.5. Private Credit

HVB

The Huntingdon Valley Bank vault represents a 100 million Dai loan participation facility with a publicly traded state-chartered commercial bank based in Huntingdon Valley, Pennsylvania. In June 2023, Huntingdon Valley Bank merged with First Citizens Community Bank; however, this merger does not affect the operation of the vault.

The facility has committed roughly $50 million in loans alongside Huntingdon Valley Bank in their ordinary course of business, creating a portfolio of business loans, construction loans, and real estate backed loans, which are performing as expected and have not experienced any delinquencies or defaults. The remaining ~$50 million is held in a money market fund, returning interest to the trust.

In August 2023, MakerDAO voted to terminate future purchases in the participation trust as a part of its "Endgame" restructuring. Following the formal notice provided by RWA Foundation, in accordance with the Master Participation Agreement, HVB must cease new commitments for the trust by January 7th, 2024. The remaining commitments in the portfolio will be funded on schedule. After January 7th, 2024, excess cash in the trust will be eligible for return to the protocol.

Blocktower Vaults

The BlockTower deal is composed of two revolving credit facilities, which combine for a total debt ceiling of 150m Dai and are collateralized by structured credit products. The vaults utilize the two-tranche Drop/Tin technology provided by Centrifuge and require a minimum 30% subordination from BlockTower's capital. While the transaction initially allowed for a total of four vaults capable of funding asset-backed facilities, forward flow agreements, whole loans, and/or structured credit products, market conditions led BlockTower to only use structured credit and reduce the total number of vaults for overall simplicity. The transaction was closed in December 2022 and BlockTower began steadily drawing from the vaults as opportunities in the structured credit markets arose. As of the end of 2023, BlockTower has drawn 126M of its 150M debt ceiling, and all assets are performing well. We expect BlockTower to utilize the remaining capacity available over the course of 2024 and replace assets as they are sold and/or amortized.

Pioneer RWA Vaults

RWA vaults 001 through 005 are considered "Pioneer RWA Vaults" and represent Maker's earliest efforts in the RWA space. The transactions, in order, are 6s Capital, New Silver, ConsolFreight, Harbor Trade Credit, and Fortunafi. Collectively, roughly 38 million Dai is issued against this collateral, with the majority held in the 6s Capital and New Silver vaults. In August of 2023, the New Silver transaction was upsized from 20 million to 50 million Dai and updated with additional covenants and legal documentation. The Stability Fee was also increased from 3.5% to 7.0%. The 6s Capital vault has a balance of over 14 million Dai; however, that money is sitting idly in a trust account, at the discretion of the asset originator. It's important to note that the balance shown on-chain for 6s is accruing continuously at a rate of 3.0% and the actual amount of Dai repaid to the vault will be less than that amount.

Pioneer RWA Defaults

It is important to note that the Harbor Trade, ConsolFreight, and Fortunafi vaults have each experienced defaults in the past year with varying degrees of severity. Two of the Pioneer RWA vaults are significantly or entirely collateralized with a portfolio of now defaulted loans. The first default occurred in the Harbor Trade transaction in April 2023. At that time, the now defaulted issuer was the only one remaining in the pool, which supported $1.8 million in senior financing, of which $1.5 million belonged to the Maker vault. The pool manager, Harbor Trade, and Steakhouse are actively engaged in a workout process and are hopeful to receive a meaningful recovery.

ConsolFreight also experienced a significant default in August 2023. The defaulted assets (all from the same issuer) affected roughly $1.8M of the $2.7M portfolio. The pool had senior debt of roughly $2M when this occurred, of which $1.9M belonged to the Maker vault. The defaulted company is in liquidation and ConsolFreight is working to maximize the recovery to the pool.

In November 2023, the Fortunafi pool experienced a default of an asset representing $500K or 7% of the total pool, from which a $65K recovery (13%) was received. As of year end, the $5.9M senior position in this pool, of which $5.7M belongs to the Maker vault, still maintained an overcollateralization rate of 109%.

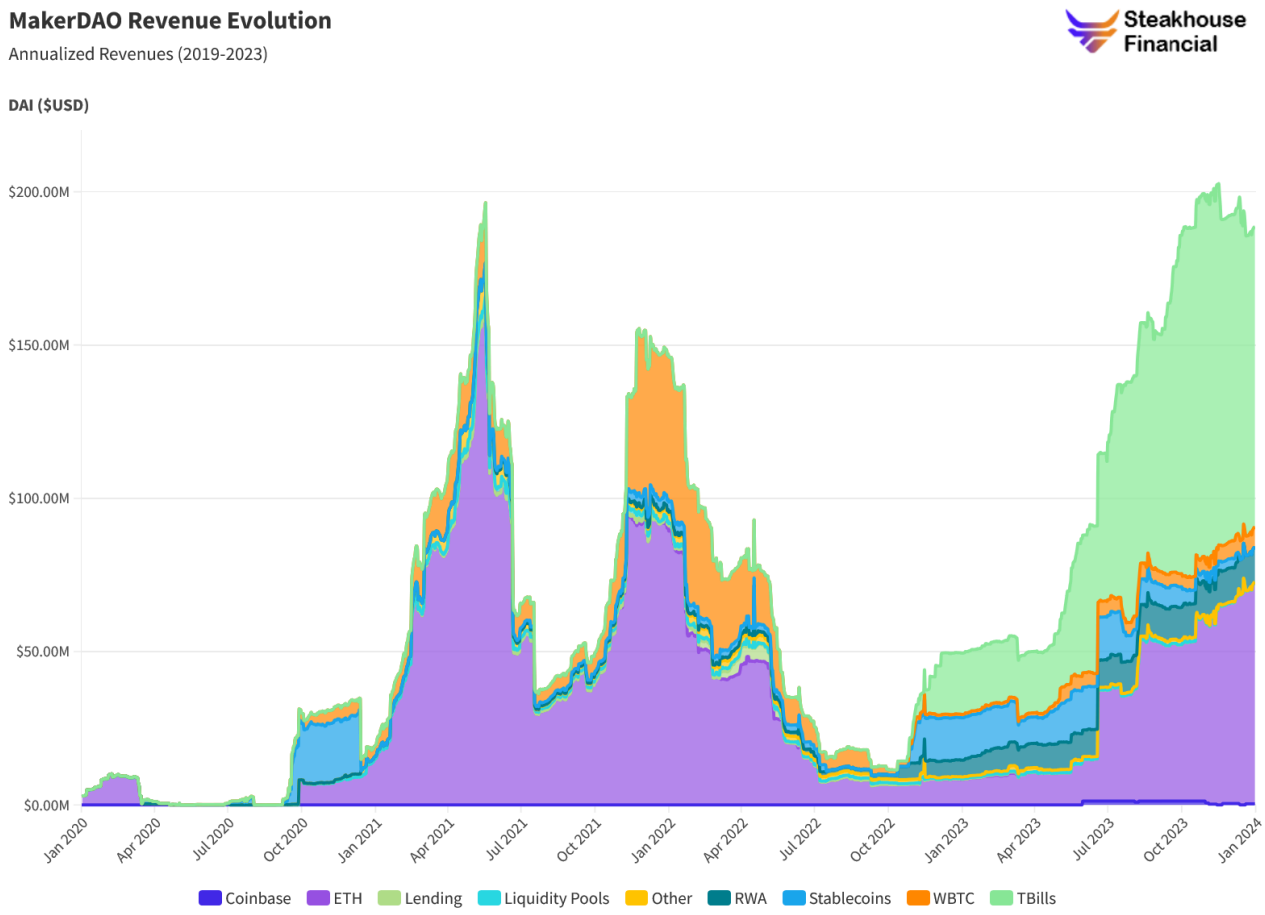
Future developments

While there has been a great deal of demand from asset originators ready to engage MakerDAO in the formation of new vaults, the transition to the Endgame plan and the delegation of RWA activities to future SubDAOs have left new initiatives on hold until the formal launch of these SubDAOs. For more information on this process, please reference the Endgame section.

Given the state of the crypto lending markets and the attractive short-term interest rate environment, we expect RWAs to be an exciting driver of the DAO and DeFi innovation in the years to come. Going forward, the RWA strategy will be driven by two new RWA-focused SubDAOs, initially codenamed "Quantitative" and "Qualitative." Currently, the

Quantitative SubDAO is expected to specialize in bringing public credit (like the US Treasuries) on-chain and enhancing the efficiency, transparency, and automation in relation to this asset class for the DAO. The Qualitative SubDAO will not only retain exposure to public credit, but specialize in private credit transactions, with a particular focus on the Asia-Pacific region.

2.4. Discussion & Analysis of the Statement of Earnings

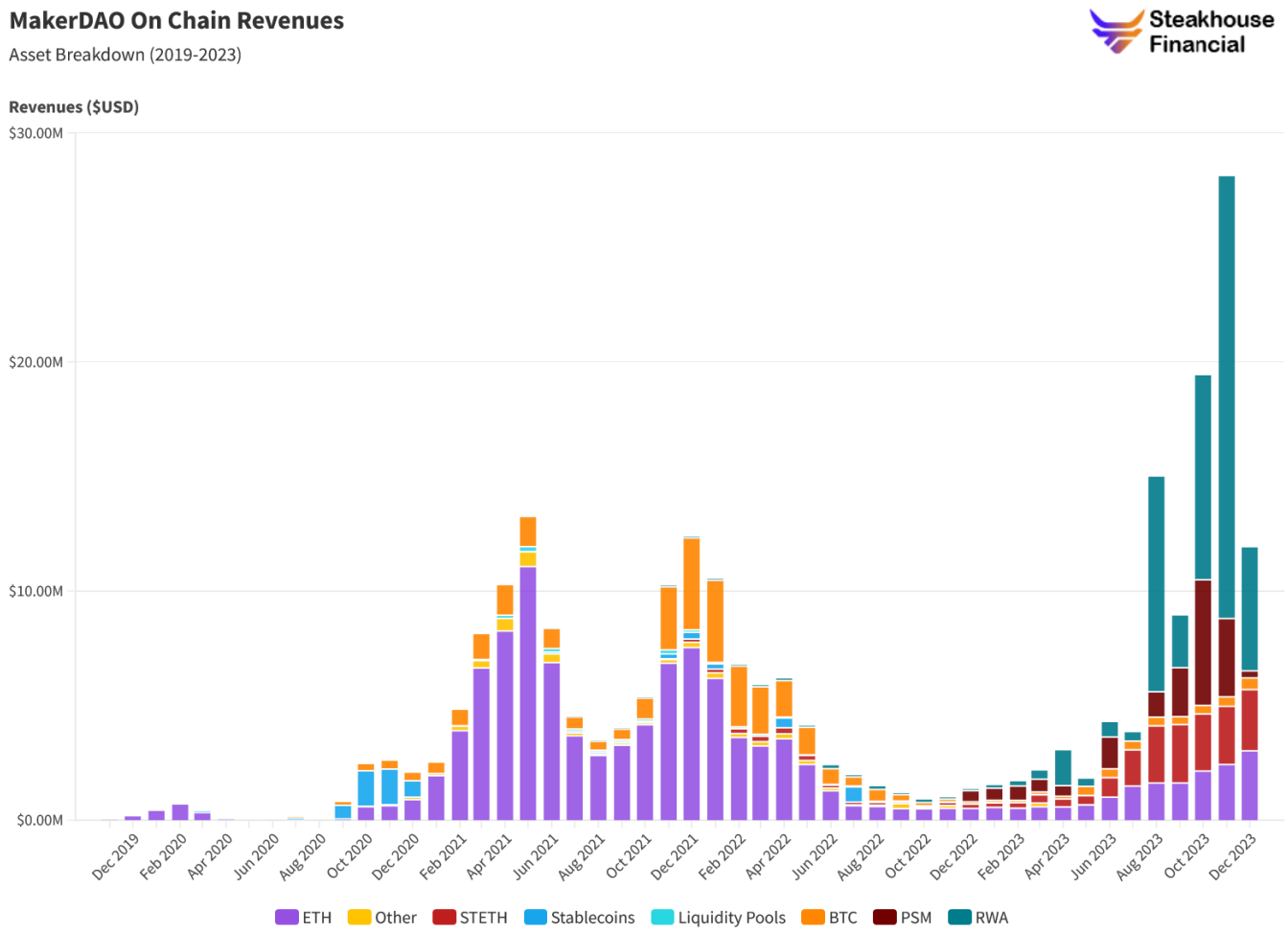


2.4.1. Consolidated Revenues

The above chart shows the evolution of Maker's consolidated revenues, which include both on-chain and off-chain revenues. Maker laid the groundwork to capitalize on the RWA opportunity in 2022, with the DAO voting to deploy Maker's excess PSM reserves, mainly into U.S. T-Bills. During 2023, allocation to productive assets increased considerably from 38% to 95% of total assets. The move was timely, as the fed funds rate climbed from near zero to 4.1% by the end of 2022, and then stabilized at 5.33% from August 2023 until the end of the year. Efficient allocation to productive assets combined with rising rates propelled Maker's annualized revenues to record levels in 2023.

The transition in Stability Fees across collateral types mirrors the evolution of the assets backing Dai, discussed in the balance sheet section. Historically, the vast majority of Stability Fees were generated by cryptocurrency collateral. However, beginning in 2023, there was a notable rise in Stability Fees generated from T-bill vaults, which now form the primary revenue stream for the protocol.

Exiting 2023, the Maker protocol is arguably in a much stronger financial position relative to 2022. Prior to 2023, Maker heavily relied on crypto-collateral lending demand and thus lacked the ability to generate a return on Dai demand at scale. However, the introduction of the arrangers and the accompanying infrastructure has enabled Maker to sustain its operations much more effectively and efficiently than it ever has in the past. This change should render Maker protocol less susceptible to cyclicality and the boom and bust cycles observed in 2021 and 2022.



On an on-chain basis, the Maker protocol has been repeatedly hitting all time highs in revenue since Q3 2023. The volatility in revenue has been driven by the arrangers returning capital on an irregular basis, and with multiple months of accrued stability fees, as the deployments into the six month treasury ladder were initially set up. Now that the capital has been deployed and the ladders have been fully ramped up, it is expected that stability fees will be paid on a more frequent basis, helping to reduce the volatility of the protocol's revenue.

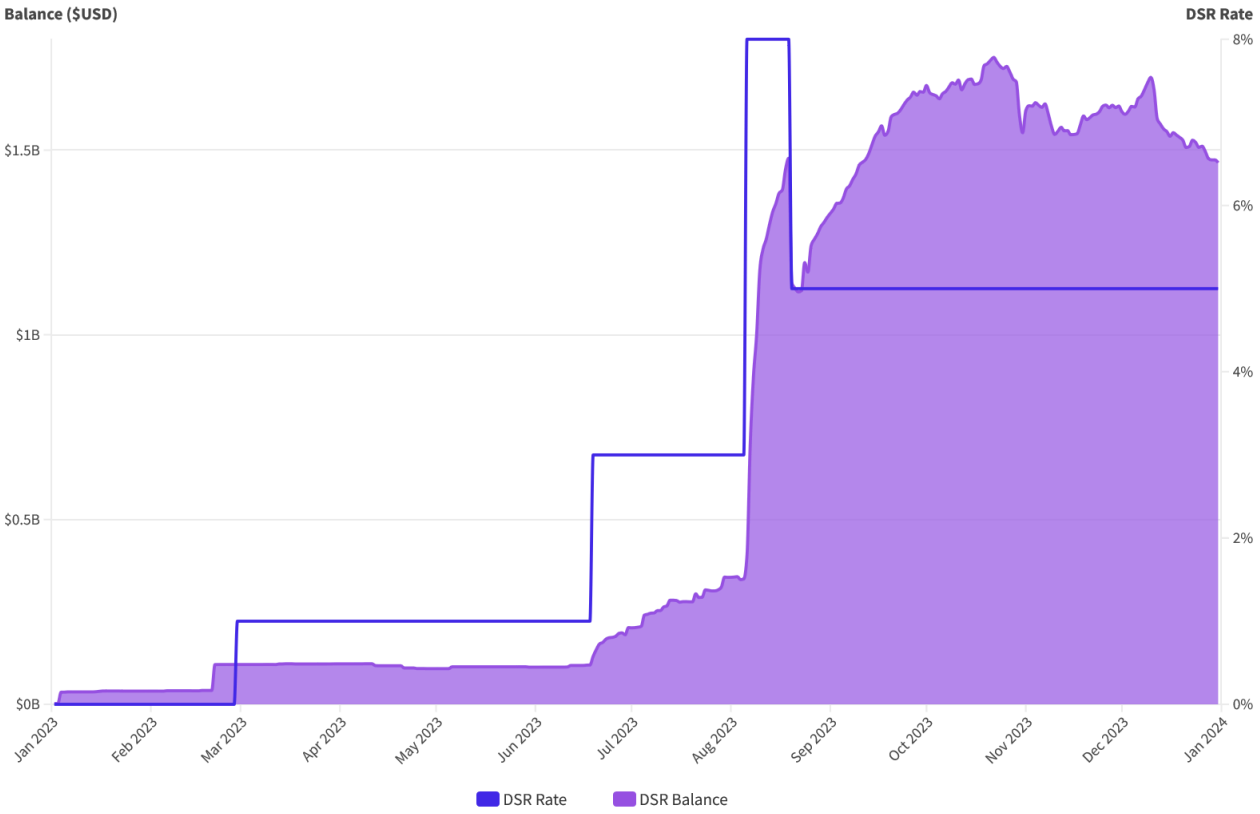
2.4.2. Operating Expenses

Another significant change in the Maker Protocol was the reactivation of the Dai Savings Rate (DSR). Starting the year at 1 basis point, the DSR was increased to 1% on March 1st, 2023 and again to 3.49% in June. On August 6th, the 'Enhanced' DSR was activated, temporarily increasing the DSR to 8% to incentivize integrations. The EDSR led to Dai inflows of 1.1B over the subsequent two-week period, reversing the downtrend in overall Dai supply witnessed throughout 2023. When the DSR rate decreased to 5% on August 20th, Dai locked in the DSR decreased by ~427M Dai overnight, but quickly rebounded in the following months.

During the latter part of 2023, crypto markets experienced a notable rebound, accompanied by a corresponding increase in other on-chain yield opportunities. In this context, the 5% DSR has become less enticing for yield farmers. As a result, Dai locked in the DSR declined by 11.5% by the close of 2023 compared to the end of Q3, with a significant portion of this decline occurring in December.

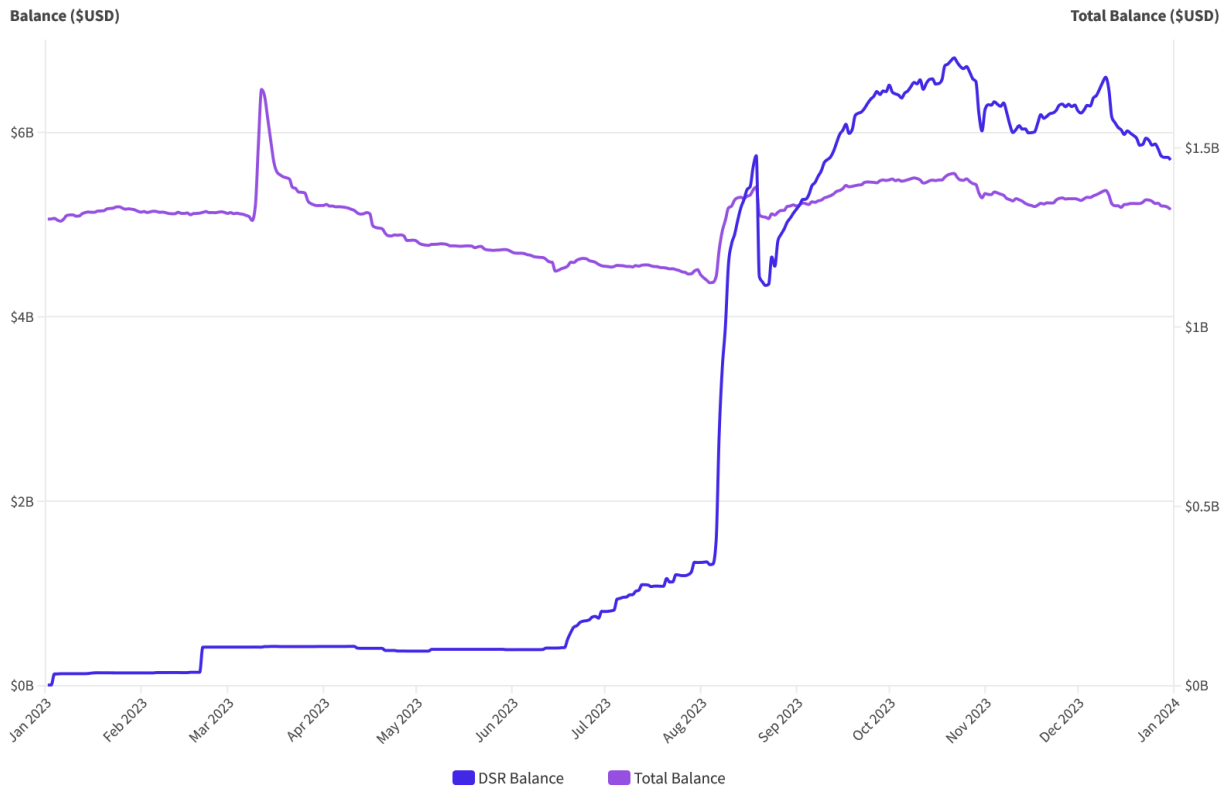
MakerDAO DSR Views

DSR Balance & DSR Rate (2023)



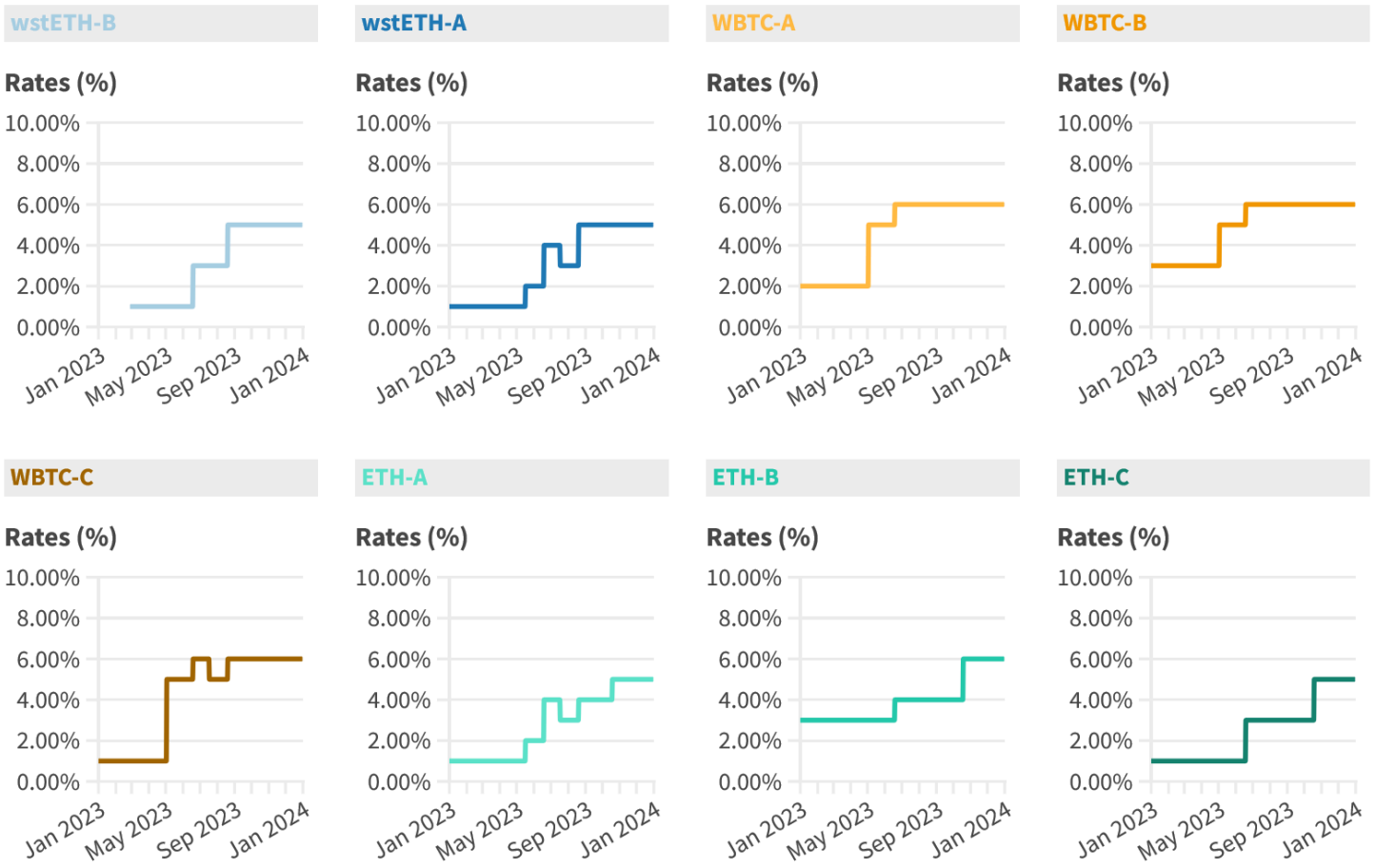
MakerDAO DSR Views

DSR Balance & Total (2023)



MakerDAO Rates Evolution

Key Maker Ilk Types (2023)



For the majority of 2023, off-chain yields (i.e. the federal funds rate and US treasury bills) provided a more compelling opportunity for lenders, including MakerDAO, compared to an idling crypto-lending market. As seen above, rates for most crypto vaults began the year around 2% as the demand for these loans had not returned since the previous bull market in 2021. In contrast, the federal funds rate started the year at 4.33% and steadily rose before stabilizing at 5.33% in August, where it remains today. During this time, MakerDAO expeditiously migrated its excess unproductive USDC PSM reserves to treasuries.

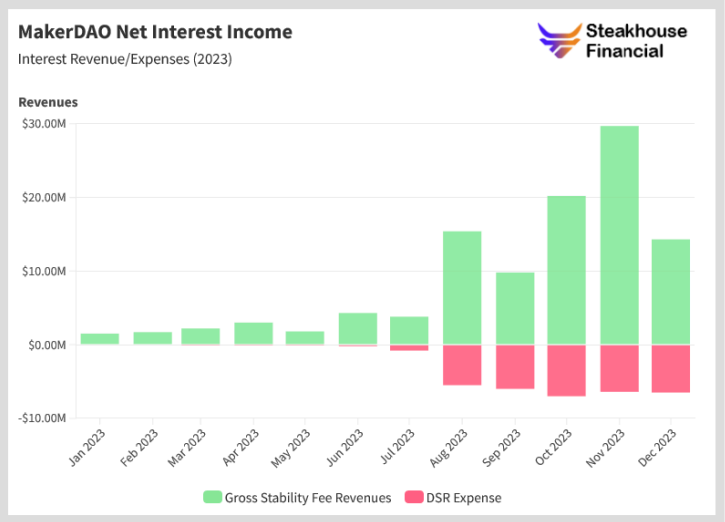
Beginning in the second half of 2023 and accelerating in the fourth quarter, the trend reversed, driven by a resurgence in the demand for crypto backed loans. On-chain activity increased more broadly and users captured the apparent arbitrage between the crypto vaults and the risk free rates in the US. As crypto-backed loans increased, this naturally drew USDC away from the PSM and forced the reduction of Maker's US treasury bill allocation. MakerDAO, incentivized to both grow its organic usage and maximize its return on assets, began gradually increasing the rates on its crypto vaults. As of year end, rates on crypto-backed vaults compete closely with US treasury bills, and MakerDAO will likely look to further adjust these rates as demand increases.

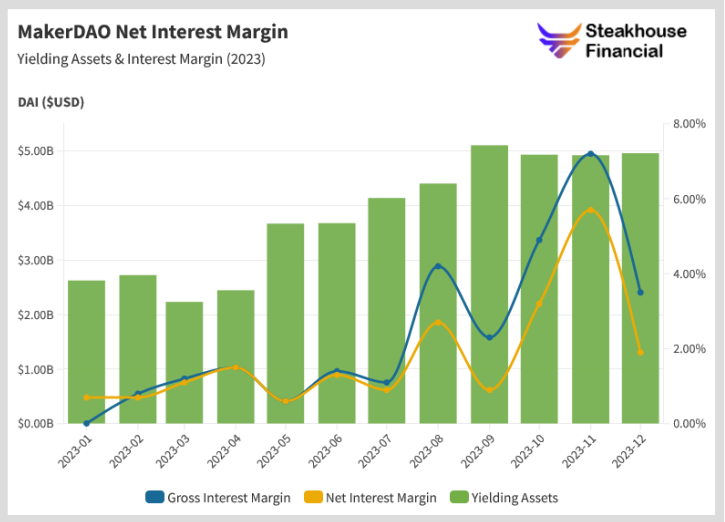
2.5. Discussion & Analysis of Key Financial Ratios

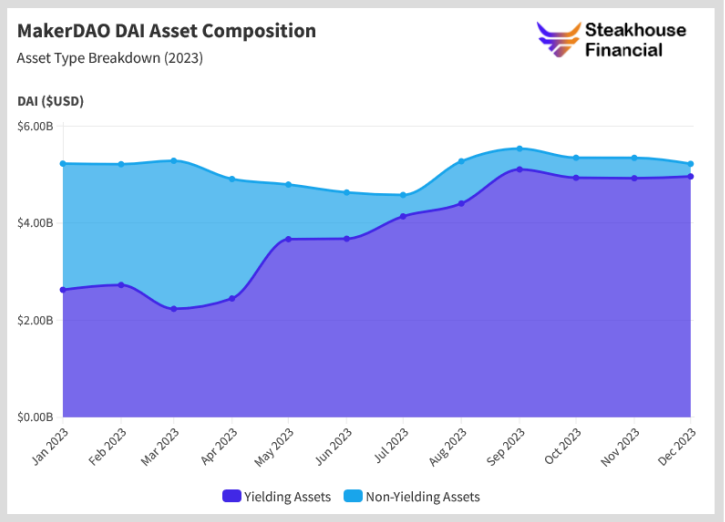
Due to cash-based reporting, monthly numbers can fluctuate considerably. Nevertheless, analysis of key ratios is presented for demonstrating the financial trend throughout the year.

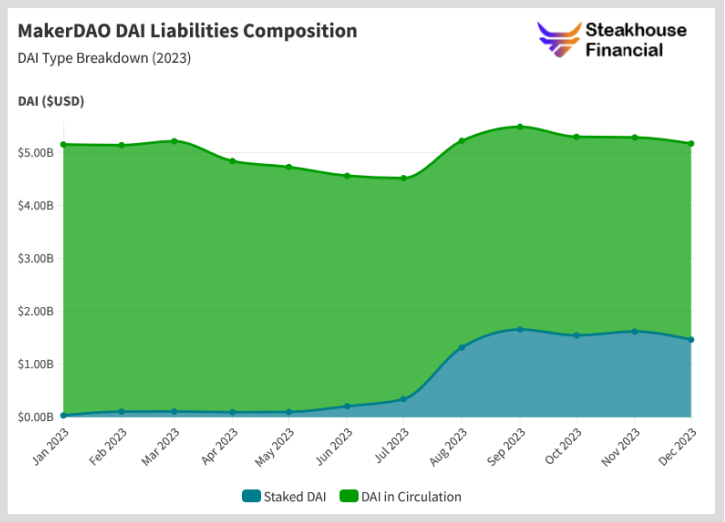
Net interest margin: During 2023, MakerDAO's net interest income rose from 1.5 million Dai in January to 7.8 million in December, propelling its net interest margin from 0.7% to 1.9%. This increase was driven by few key developments:

- **Yielding assets** increased from 2.6 billion Dai (50% of total assets) to 4.9 billion Dai (95% of total assets) from a higher allocation to productive RWAs.
- **Gross interest margin** expanded from 0.7% to 3.5%, helped by rising interest rates.
- **DSR (Dai Savings Rate) interest expense** grew more slowly than interest income. With the increase in the DSR from 1 basis point to 5% over the year, the proportion of Dai that is locked to earn interest ("sDai") rose from <1% to 28% of Dai in circulation. The resulting growth in interest expense however trailed the growth in interest income, expanding Maker's net interest margin.



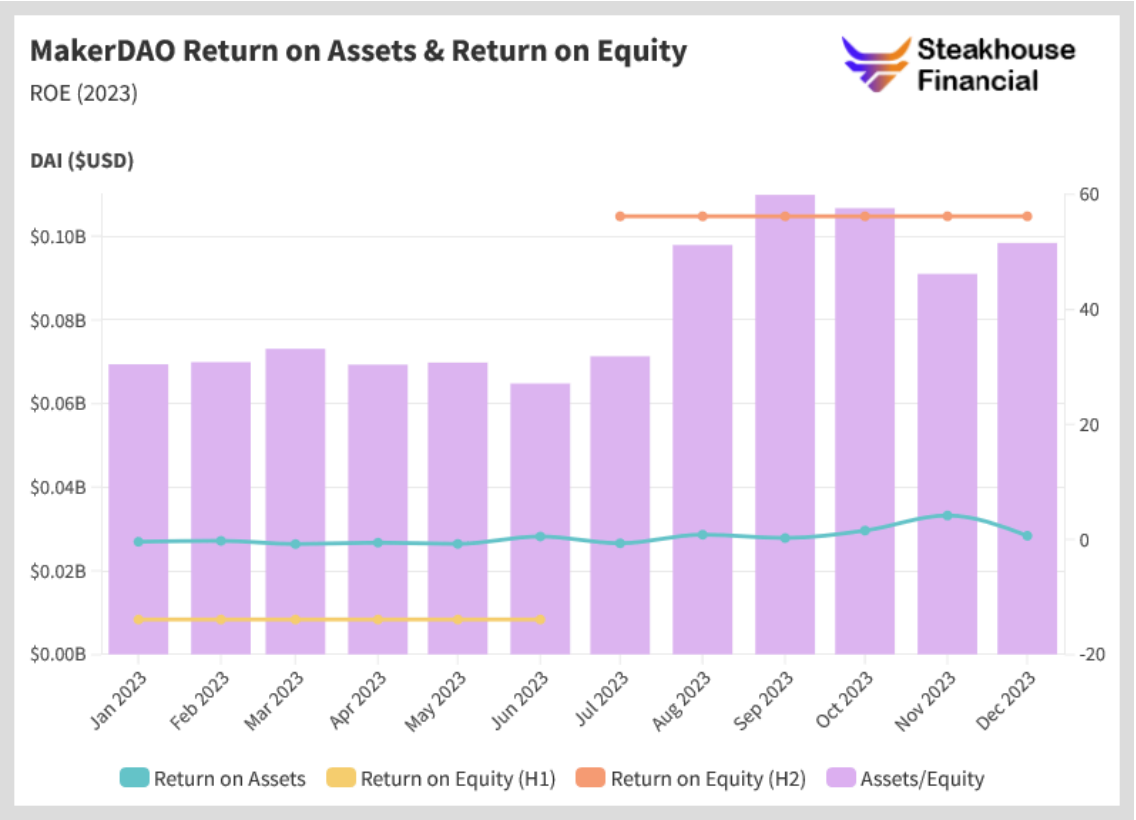






Return on Assets (ROA) & Return on Equity (ROE): Throughout the year, a rise in interest rates and proportion of yielding assets helped net operating income improve from losses to profits. Accordingly, annualized ROA expanded from -0.4% in January to 0.7% in December. Meanwhile, retained income pushed the Surplus Buffer over 50 million Dai, activating the Smart Burn Engine in July. The result was a reduction in the Surplus Buffer and total equity. During this time, assets grew and so did leverage (assets/equity).

As can be seen in the below chart, rising income and leverage during the second half of the year gave rise to two distinctive periods for MakerDAO's ROE. During H1, the DAO was lossmaking with average ROE at -13.9%. In H2, average ROE increased to 56.2%.



2.6. Discussion & Analysis of Crypto Lending Markets

2.6.1. ETH & stETH Market - Ethereum Mainnet

ETH and stETH locked in major DeFi Protocols (defined as MakerDAO, Aave, Compound, Liquity, and Spark) continued rebounding from the local monthly bottom made in July 2022, with ETH and stETH collateral locked increasing by 30% by the end of 2023. ETH and wstETH locked in into the MKR protocol increased by 209K(+11%) during the same period.

Major DeFi lending protocol balances collectively increased by 26% vs year end 2022, with Maker and Aave increasing by 12% and 11% respectively, taking market share from Compound and Liquity, which saw deposits decrease by 6% and 8% respectively. If we consolidate Spark's ETH and wstETH deposits with Maker, YoY growth would've been +1M ETH or +52%.

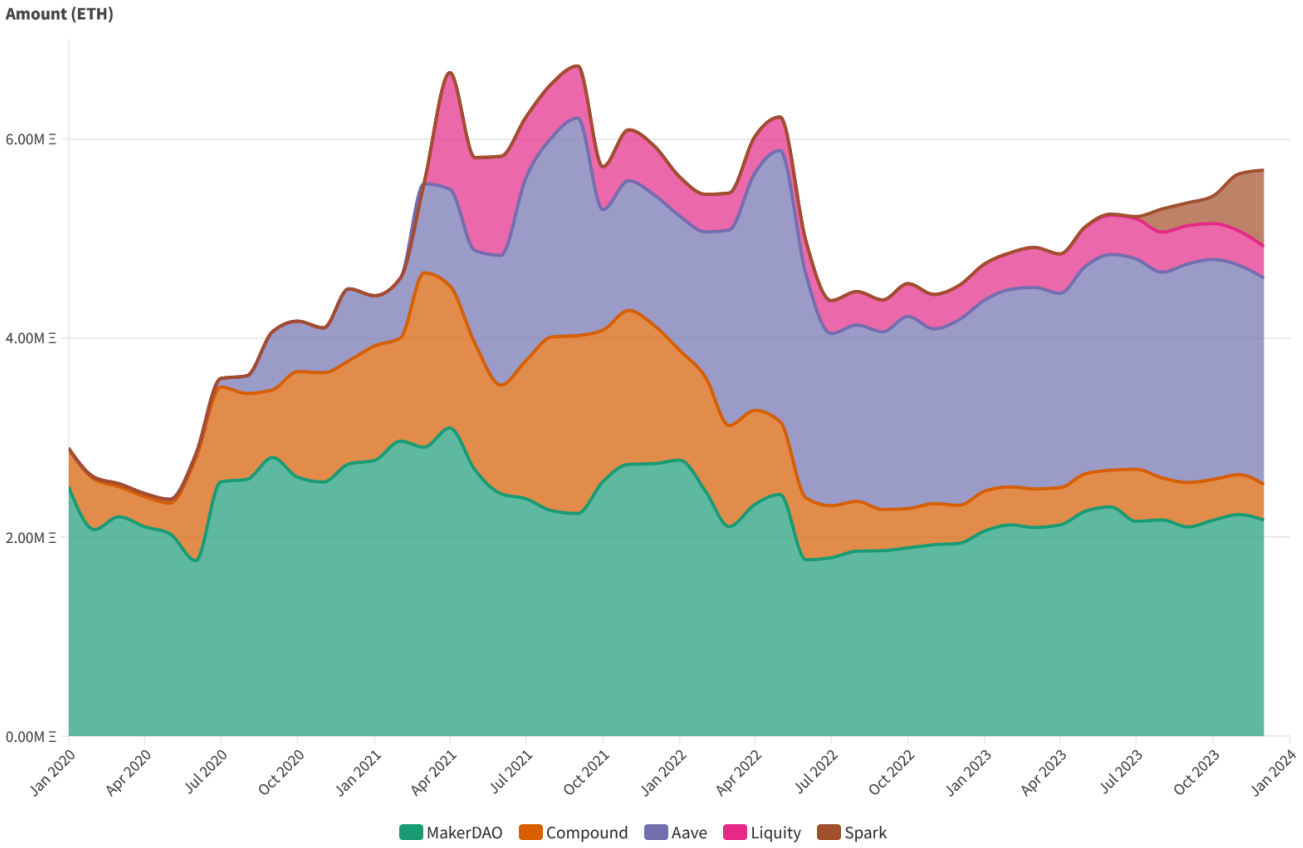
Deposits on lending protocols ended 2023, down 16% from the all-time high in September 2021 of 6.7M ETH, which preceded the peak of the prior bull market cycle in November that year (defined as all-time highs in BTC and ETH).

Despite bullish sentiment increasing markedly in Q4, on-chain leverage increases remained relatively steady with month over month increases in ETH and wstETH deposits hitting 1.2%, 4.1%, and 0.7% growth over the last three months of the year. Rapid increases in on-chain leverage could indicate overly aggressive trader and investor positioning and that a short-term top could be near.

Though aggregate on-chain leverage is somewhat elevated in ETH terms, it remains significantly down (54%) from the 2021 market peak in dollar terms. Given the implosion of the CeFi lending industry in 2022 which saw the likes of Genesis, BlockFi, Celsius, and others go bankrupt, it is difficult to assess what to attribute the on-chain leverage growth to. It is plausible that due to the lack or perceived lack of CeFi lending options, more borrowers are using DeFi protocols. Including Spark, the Maker ecosystem saw ETH and stETH deposits in dollar terms nearly triple in 2023, from $2.3B to $6.7B (+189%) outpacing the broader market which increased 140% vs prior year.

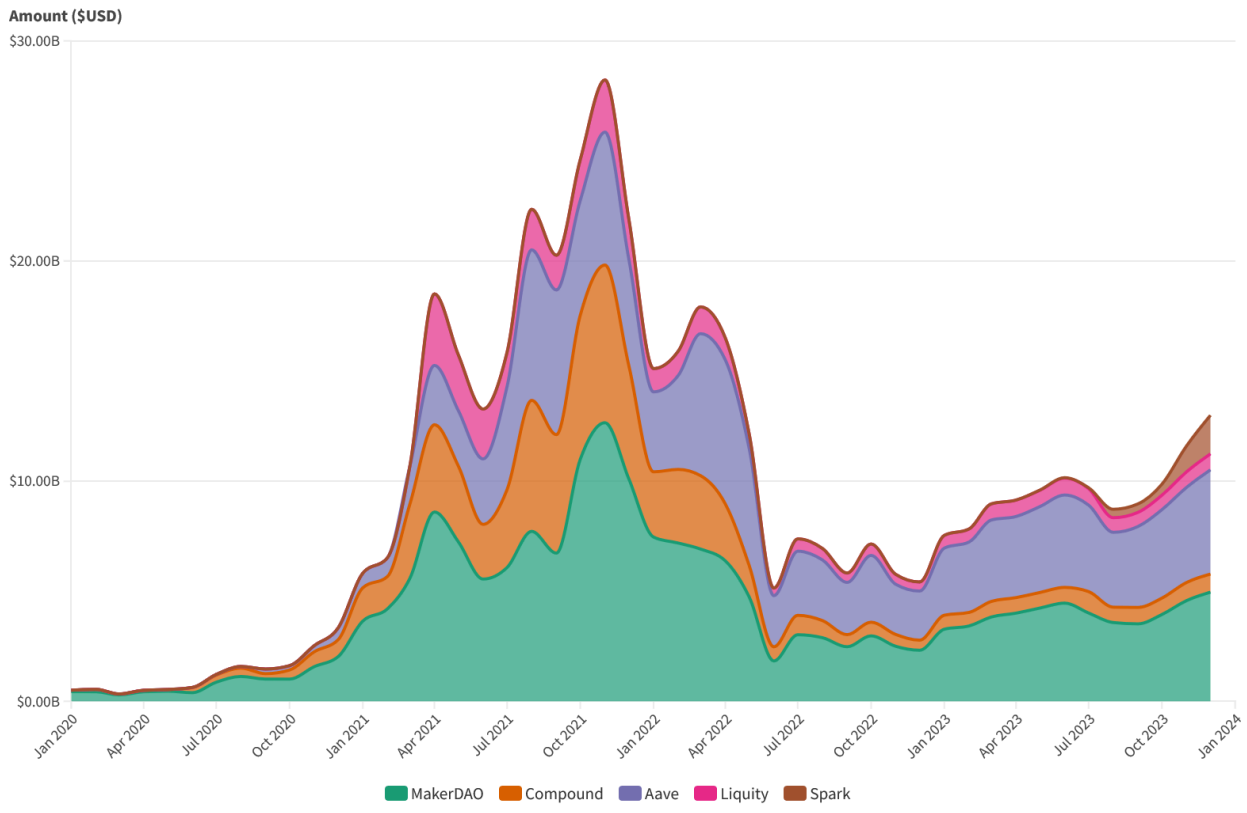
ETH/stETH Lending - ETH Mainnet

Protocol Breakdown (2020-2023)



ETH/stETH Lending - ETH Mainnet

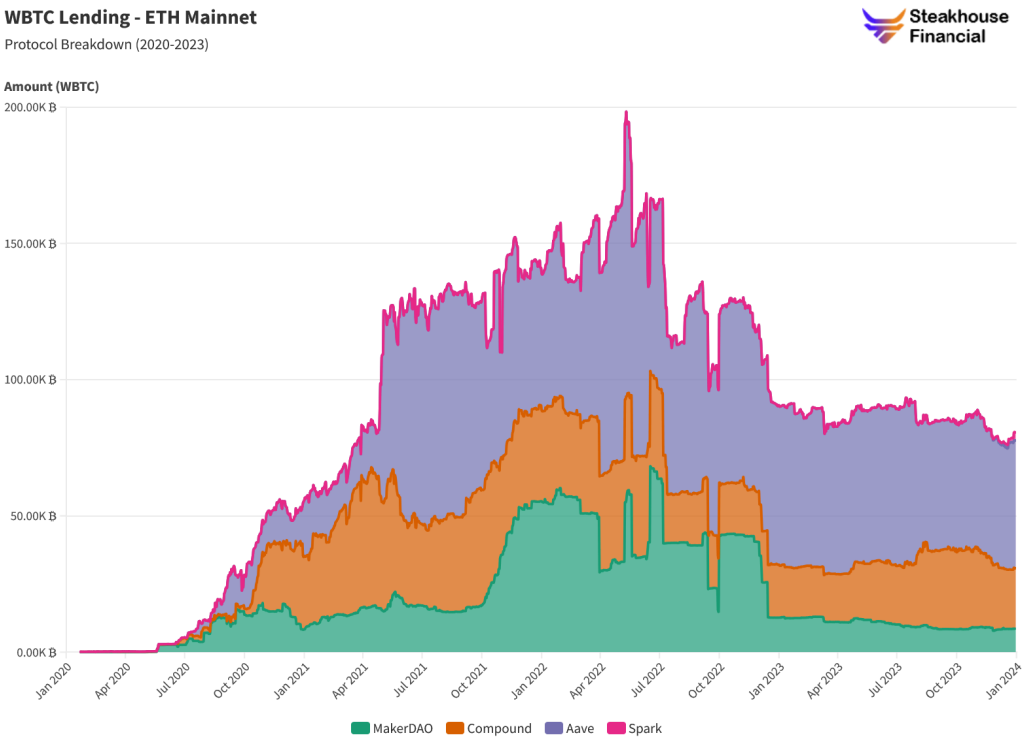
Protocol Breakdown (2020-2023)

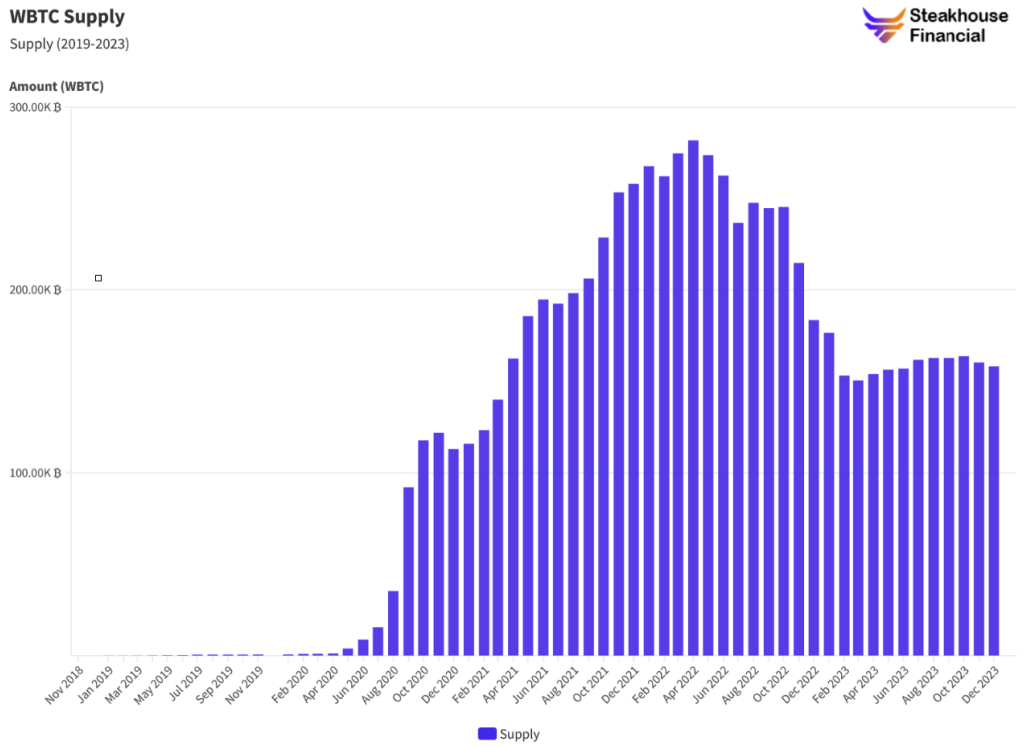


2.6.2. WBTC Market - Ethereum Mainnet

One area of the market that has not bounced back has been the WBTC lending market. WBTC usage as collateral has been down only throughout nearly the entirety of 2023 across all Major DeFi lending protocols. WBTC locked into the Maker protocol haven't been this low since August 2020. Though overall WBTC supply is still down significantly from peak (-44% as of year end 2023), it is finally showing signs of life, up 5% from the local low set in March 2023.

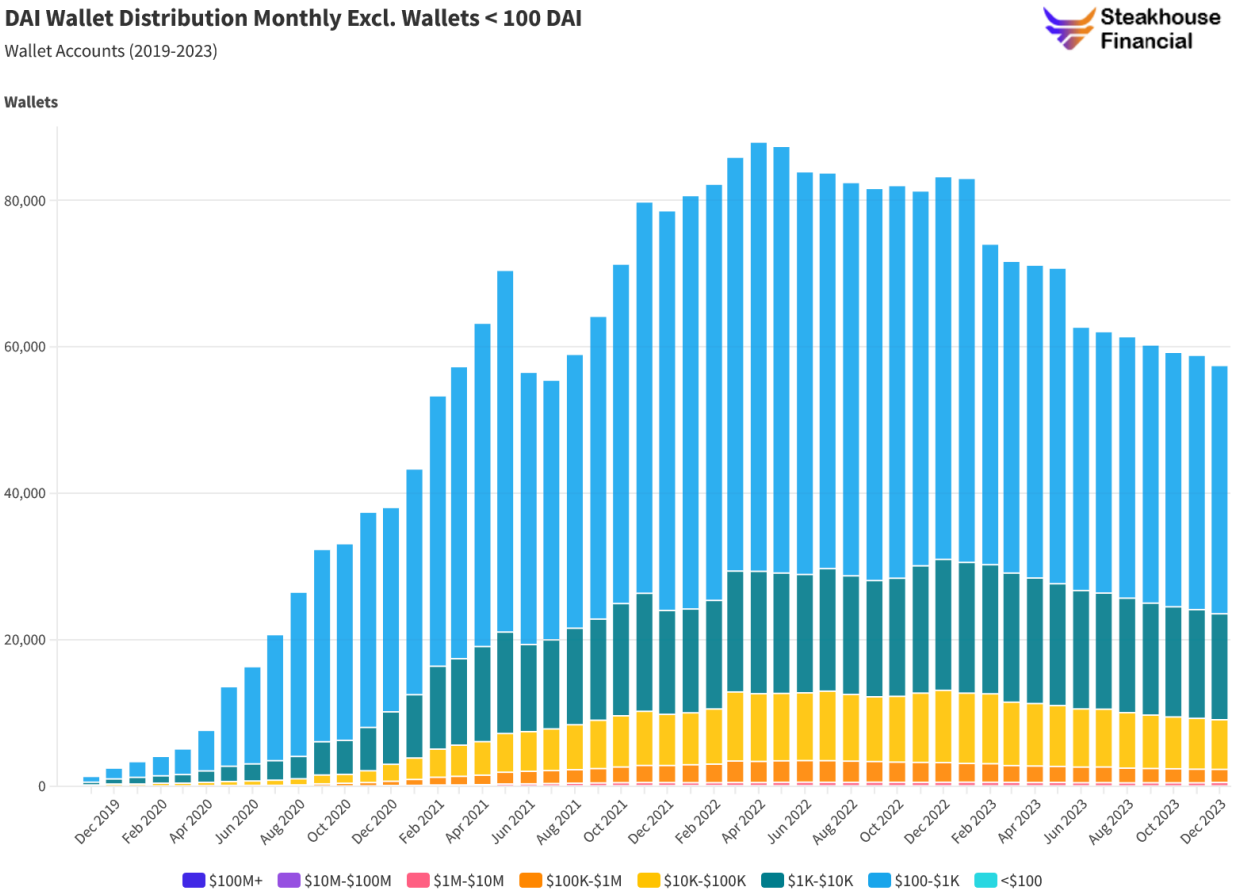
With the creation of the Spark SubDAO, the Maker protocool now has exposure to the cross-collateralization benefit that existing money market protocols such as Aave and Compound have, which may lead to increased market share for the Maker ecosystem if Spark borrows were consolidated into Maker's balance sheet.





3. Additional Insights on 2023

3.1. Dai Supply & Demographics - ETH Mainnet

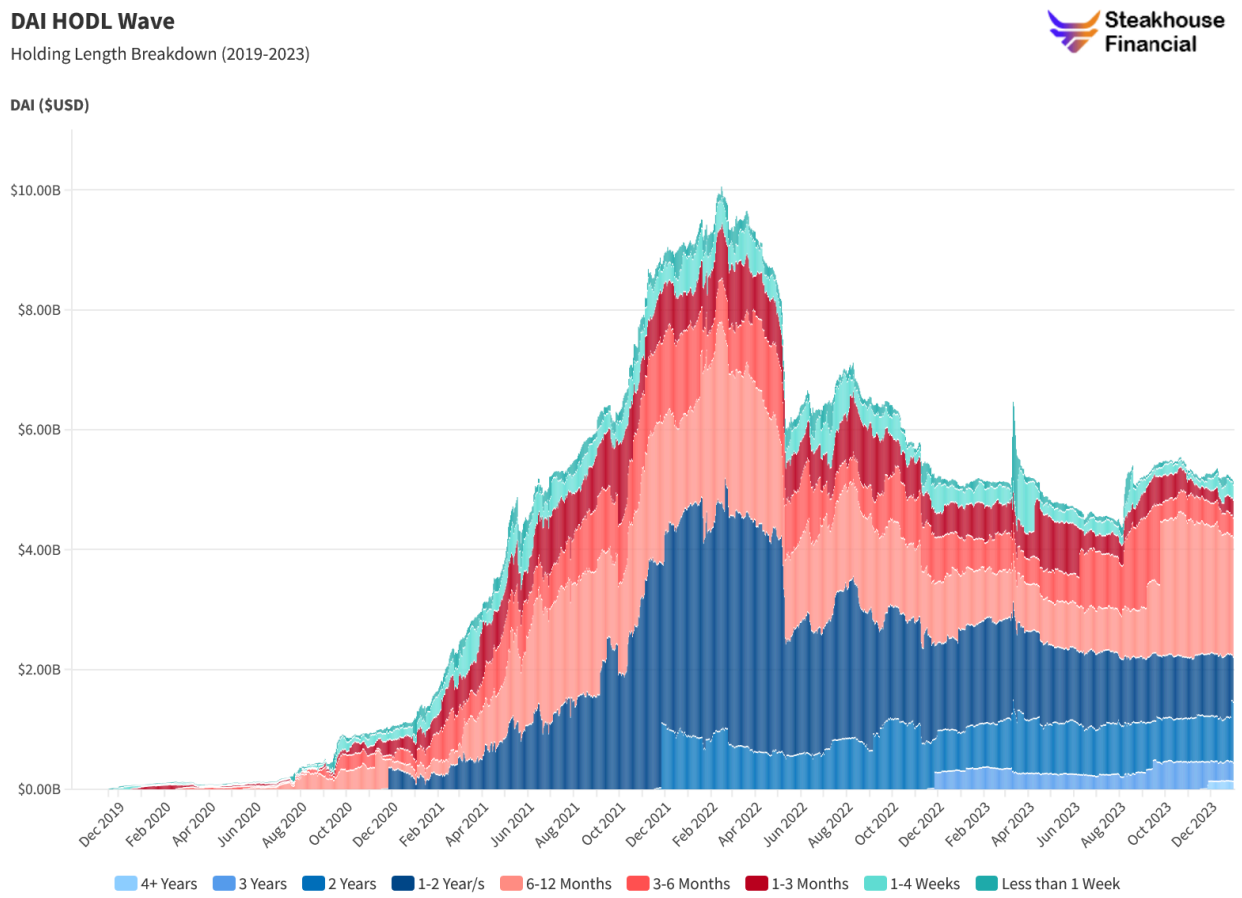


Segment	2020	2021	2022	2023	vs '22	vs '21	vs '20
$100M+	2	10	7	4	-43%	-60%	100%
$10M-$100M	14	82	63	46	-27%	-44%	229%
$1M-$10M	99	423	487	433	-11%	2%	337%
$100K-$1M	577	2,329	2,684	1,909	-29%	-18%	231%
$10K-$100K	2,317	6,985	9,862	6,967	-29%	0%	201%
$1K-$10K	7,160	14,175	17,880	14,902	-17%	5%	108%
$100-$1K	27,802	54,473	52,152	34,548	-34%	-37%	24%
<$100	163,957	282,251	318,668	333,904	5%	18%	104%
Total	**201,928**	**360,728**	**401,803**	**392,713**	**-2%**	**9%**	**94%**

Despite total Dai supply increasing slightly in 2023, total wallets decreased by 2% vs 2022. Excluding the <100 Dai segment, wallet counts decreased by 29%. Multiple factors likely contributed to the observed decrease. Firstly, the increasing popularity of Ethereum layer two solutions may have prompted cost-sensitive stablecoin users to migrate away from mainnet. Second, the reactivation of the DSR likely reduced wallet counts, as Dai deposits into the DSR are essentially removed from circulation to contribute to the sDai supply. Lastly, organic demand for Dai may have declined, with users potentially shifting their preferences towards other stablecoins such as USDT. In 2023, the supply of USDT* grew significantly from $66.2 billion to $91.7 billion (+39%). This growth also came at the expense of Circle's USDC*, whose total supply shrank from $44.6 billion to $24.5 billion during the year (-45%). USDC's decline was likely influenced by Circle's exposure to the US regional banking crisis. In March 2023, Circle disclosed that $3.3 billion of its cash reserves were stuck at the failed Silicon Valley Bank (SVB). Heightened market selling of USDC caused the stablecoin to drop to $0.87 before regaining its 1:1 dollar peg upon news of the US government guaranteeing all of the bank's deposits.

**Per Coingecko*

3.2. Dai Holding Period by Segment



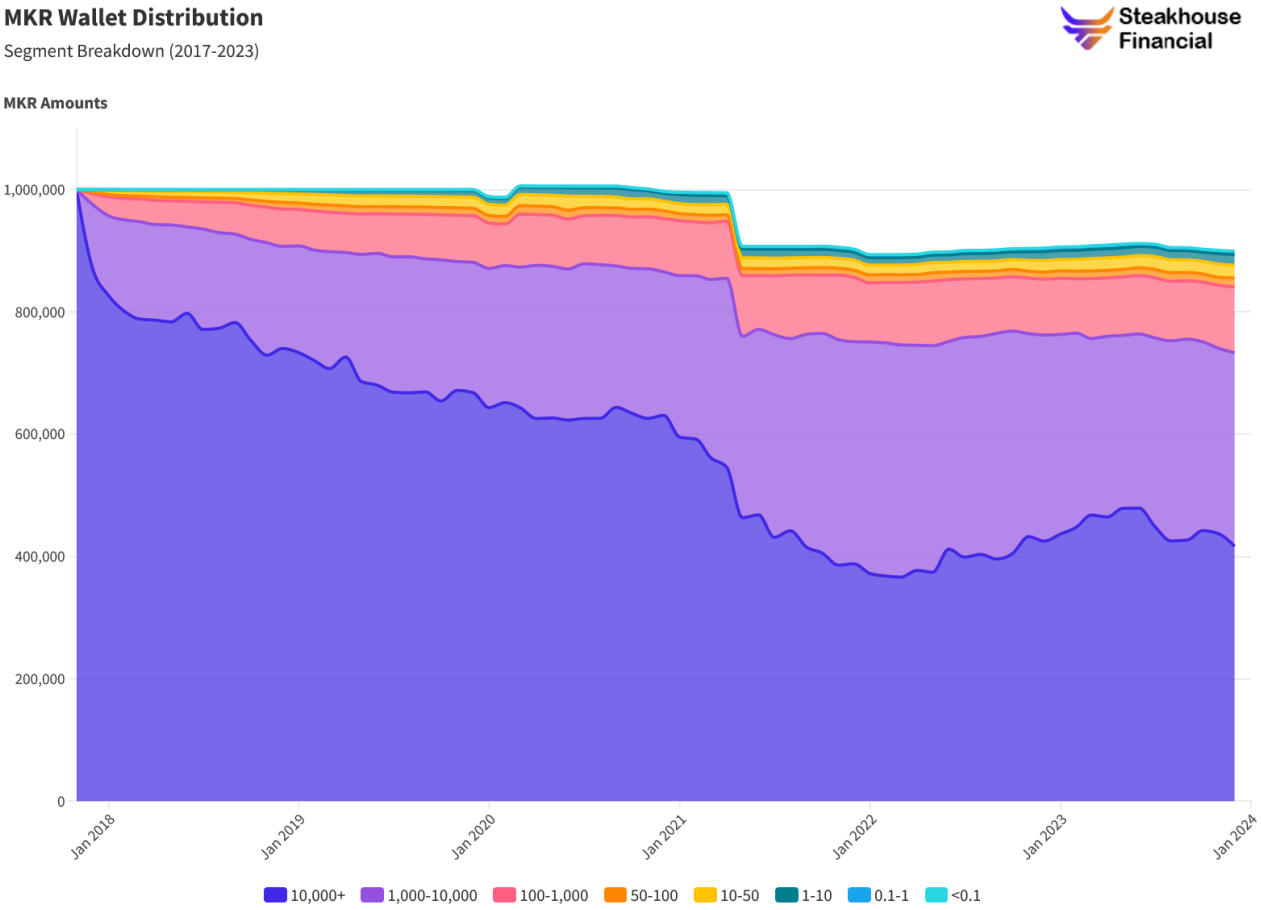
Segment	2020	2021	2022	2023	vs '22	vs '21	vs '20
Less than 1 Week	287M	162M	57M	71M	24%	-56%	-75%
1-3 Months	278M	583M	541M	302M	-44%	-48%	9%
1-4 Weeks	130M	604M	269M	247M	-8%	-59%	90%
3-6 Months	180M	1413M	631M	323M	-49%	-77%	80%
6-12 Months	152M	1586M	902M	1987M	120%	25%	1206%
1-2 Year/s	164M	3816M	1720M	752M	-56%	-80%	359%
2 Years		894M	630M	1011M	61%	13%	-
3 Years			304M	325M	7%	-	-
4+ Years				159M	-	-	-
Total	**1191M**	**9059M**	**5055M**	**5178M**	**2%**	**-43%**	**335%**

The above chart shows the recreation of the well-known Bitcoin HODL wave analysis for Dai.

Long-term Dai HODLers, which we define as wallets that have held Dai for 2+ years, increased by 60% year-on-year from 933M to 1.49B Dai by the end of 2023. These HODLer wallets accounted for 29% of all Dai wallets at the end of 2023, up from 18% the previous year.

However, holding patterns in the shorter-term Dai holders are much more variable. For instance, wallets that held Dai for 1-2 years declined by 56% while those that held Dai for 6-12 months increased 120% year-on-year.

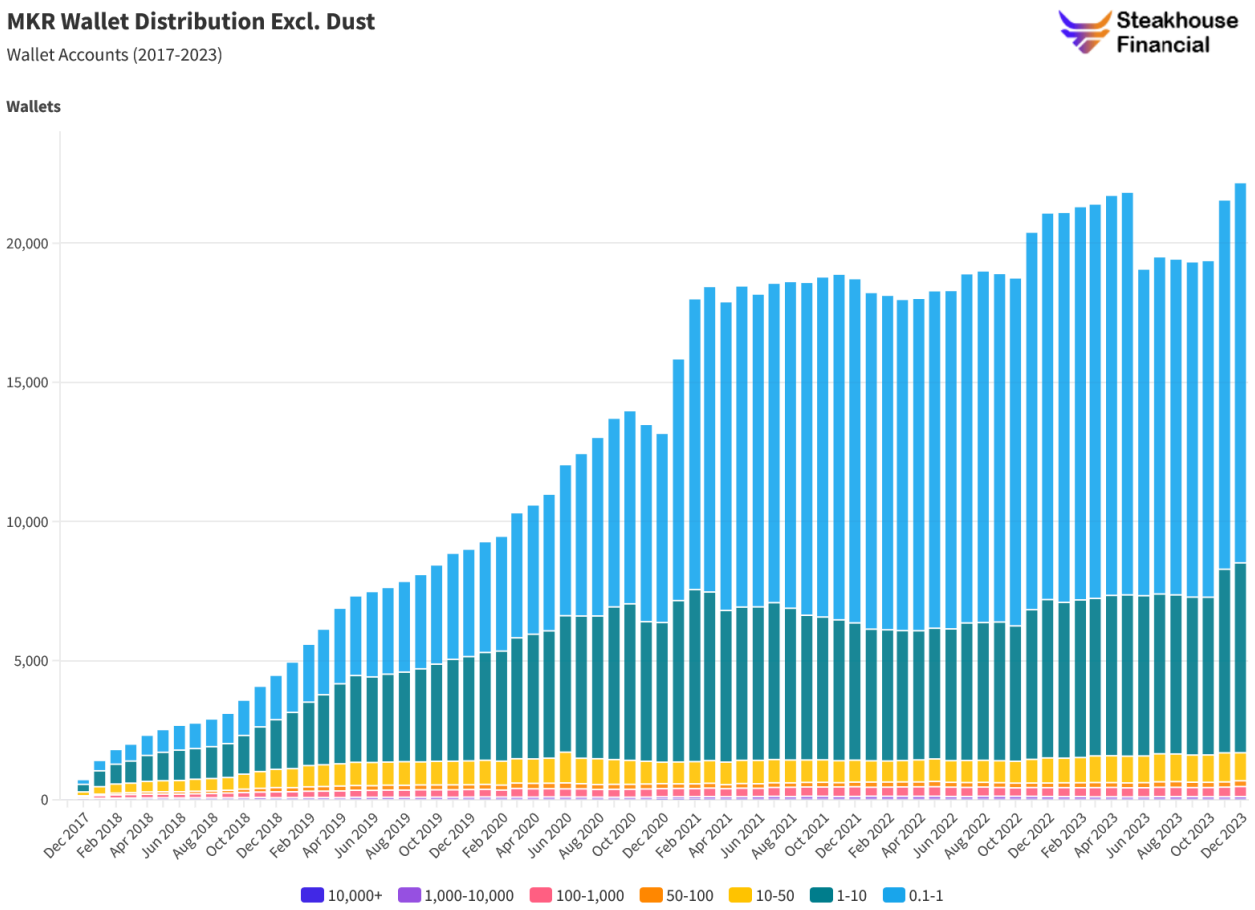
3.3. MKR Supply & Demographics



Segment	2020	2021	2022	2023	vs '22	vs '21	vs '20
10,000+	630,947	388,102	425,162	416,701	-2%	7%	-34%
1,000-10,000	234,683	363,077	336,970	316,468	-6%	-13%	35%
100-1,000	86,878	105,325	91,300	107,649	18%	2%	24%
50-100	12,700	11,881	11,693	14,607	25%	23%	15%
10 - 50	15,776	16,409	18,919	20,972	11%	28%	33%
1 - 10	13,070	12,836	14,536	17,378	20%	35%	33%
0.1-1	2,790	4,468	5,157	4,799	-7%	7%	72%
<0.1	259	592	695	781	12%	32%	202%
Total	**997,103**	**902,690**	**904,431**	**899,355**	**-1%**	**0%**	**-10%**

On-chain ownership of the MKR token largely broadened in 2023, with wallets holding 1-10, 10-50, 50-100, and 100-1,000 all increasing their MKR by 20%, 11%, 25%, and 18% respectively. The 'minnow segment' - those holding between 0.1 and 1 MKR (valued at approximately $170 to $1,700 as of 12/31/23), decreased by 7%. The ownership of the MKR token is likely more distributed than the wallet data suggests, as multiple wallets in the 1,000+ segment include centralized exchanges, DeFi smart contracts, and bridges which aggregate multiple wallets into a single address.

MKR holders between 1 and 1,000 MKR increased their ownership of the MKR token by 18% compared to 2022, from 136K to 161K MKR tokens. The total voting power this segment holds increased from 15% to 18% YoY. Given that the average amount of MKR tokens sitting in the Governance Contract in 2023 was about 180.1K MKR tokens, this MKR 'middle class' would have tremendous voting power and influence over the protocol if they collectively participated in Governance. Governance participation has been one of the biggest challenges in DAOs, as often there is little or no incentive to participate, and even disincentives for individuals who reside in jurisdictions in which DAO governance participation may be perceived to carry legal risks.

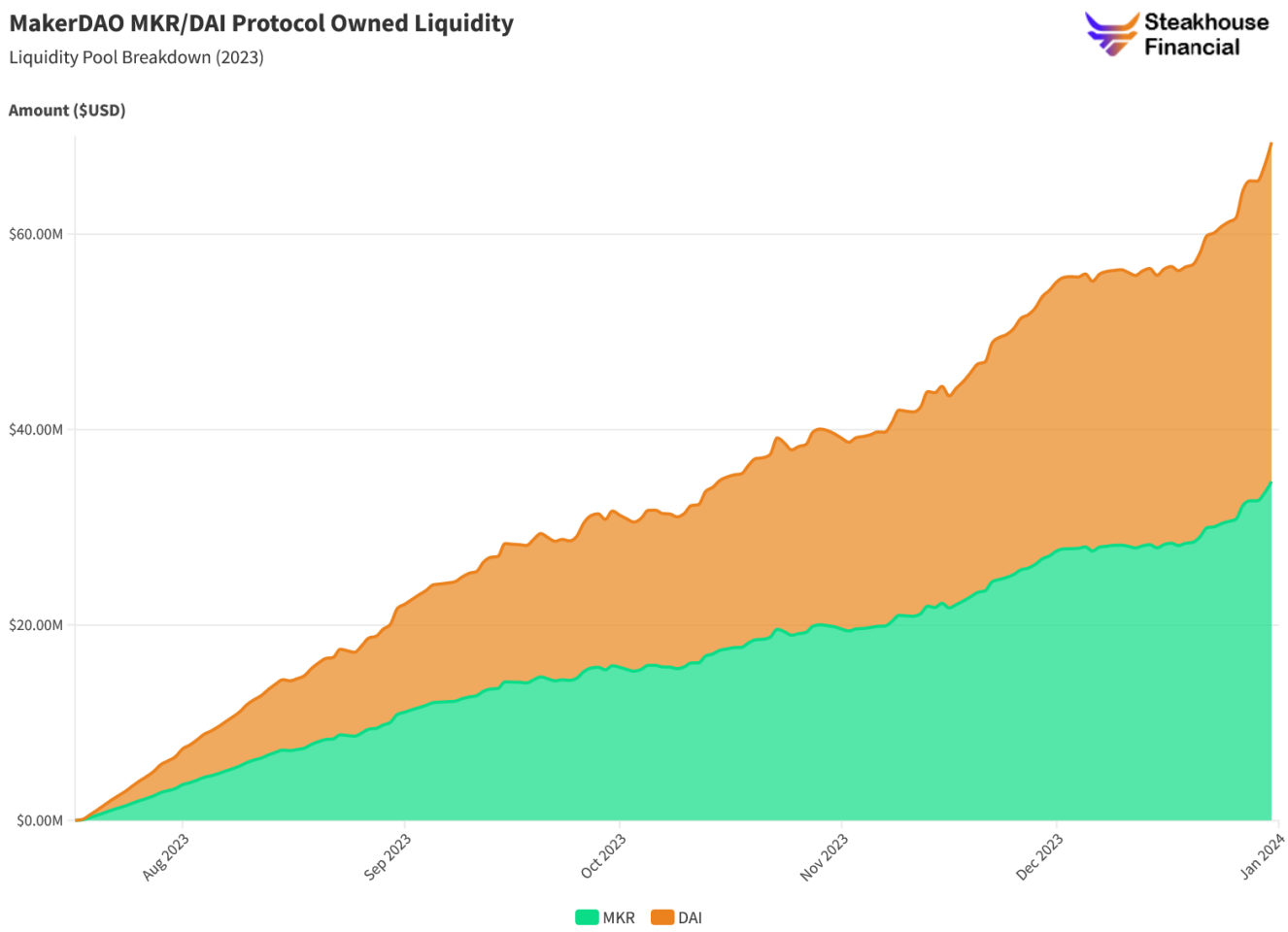


Segment	2020	2021	2022	2023	vs '22	vs '21	vs '20
10,000+	22	11	12	14	17%	27%	-36%
1,000-10,000	86	107	104	99	-5%	-7%	15%
100-1,000	291	349	319	361	13%	3%	24%
50-100	179	167	166	207	25%	24%	16%
10 - 50	771	789	903	1,009	12%	28%	31%
1 - 10	5,018	4,932	5,689	6,822	20%	38%	36%
0.1-1	6,773	12,345	13,867	13,637	-2%	10%	101%
<0.1	11,279	18,486	21,291	23,247	9%	26%	106%
Total	**24,419**	**37,186**	**42,351**	**45,396**	**7%**	**22%**	**86%**
Excluding <0.1	13,140	18,700	21,060	22,149	**5%**	**18%**	**69%**

The number of wallets holding MKR tokens increased 7% from 2022 (5% excluding <0.1 MKR wallets) and given the analysis on the prior page, suggest increased ownership of the MKR token by new holders. Wallet count growth in the MKR 'middle class' of 1 to 1,000 MKR grew 19% compared to 2022, with the strongest growth observed in the 50-100 MKR segment which grew 25%.

The growth in the amount of wallets holding MKR has been quite consistent over the past few years, despite the fact that the price of the MKR token remains considerably lower than the all-time high of $6,067 in Q2 2021. MKR ended 2021 valued at $2,341 and 2022 valued at $513, per Coingecko.

3.4. Protocol Owned Liquidity



One of the major initiatives in 2023 was the introduction of the Smart Burn Engine. The Smart Burn Engine is a novel smart contract system designed to allocate excess Dai from the Surplus Buffer to acquire MKR, and pair it with Dai in a Uniswap v2 contract.

The Smart Burn Engine activates when the Surplus Buffer is >50 million Dai and takes the following steps when such condition is met:

1. Use Dai to acquire MKR on Univ2 Dai/MKR market
2. Match the acquired MKR with additional Dai
3. Supply the matched MKR & Dai tokens to Univ2 Dai/MKR market
4. Transfer the acquired LP tokens to a protocol owned address

The rationale for using the Surplus Buffer to provide liquidity to the Dai/MKR market is to make it easier for market participants to buy the MKR token on-chain and participate in governance. Higher governance token liquidity is generally associated with lower price volatility and lower transaction costs from narrower spreads.

The byproduct of taking an LP position is the exposure to LP impermanent gain/loss, which arises when the price of one asset in the pair moves significantly relative to the other. The protocol's Dai/MKR LP ended 2023 valued at 68.8 million Dai, with an impermanent gain of 0.2 million Dai, inclusive of trading fees attributable to the position.

MakerDAO MKR/DAI Protocol Owned Liquidity

Impermanent Change (2023)

4. Asset-Liability Management View on 2023

As defined in the ALM Framework, a stablecoin protocol must observe two hard constraints to make Dai safe: solvency, i.e. the sound backing of Dai, and liquidity, i.e. keeping the peg strong.

More details on how to manage a DeFi stablecoin can be found in the Stablecoin Manual by Steakhouse.

4.1. Formation of the ALCO

The Asset-Liability Management Committee (ALCO) was created in September 2023 to conduct research for Maker Governance on ALM policy. At the end of 2023, the ALCO was composed of the following members:

- adcv, Chairman of the meetings, Steakhouse Financial co-founder
- Moorad Choudhry, independent advisor, currently a Non-Executive Director at two UK FIs
- Sébastien Derivaux, Steakhouse Financial co-founder
- balloonist, founder of Balloonist ApS

Further community participation is expected to expand throughout 2024 and the results encoded into Atlas. A dedicated Dune dashboard to track ALM metrics and support the ALCO can be found here. The ALCO published meeting notes here. Further publication from the ALCO on the forum can be found using the #alco-ppg tag.

To feed the ALCO work, Steakhouse researched and published a Risk Management Framework for DeFi Protocols which suggests the formalization of a Risk Appetite Statement for MakerDAO, such that all stakeholders have a clear view of the risk profile of Dai.

Steakhouse also published a paper Real-time Risk Metrics for Programmatic Stablecoin Crypto Asset-Liability Management (CALM) to formalize solvency and liquidity metrics to be observed.

The detailed parameters defined by the ALCO for each MakerDAO balance sheet item can be found here. Each collateral can have multiple entries to reflect the evolution of the risks and expected yield over time.

To provide the high-level summary, balance sheet items are regrouped in four categories:

- **Crypto-backed loans:** Using crypto native assets as collateral to borrow Dai. Main risk for this exposure is the risk of liquidation that can incur bad debt.

- **Public credit:** Contains the exposure to publicly traded instruments, currently only T-bills operated through the Clydesdale and Andromeda structures.

- **Private credit:** Legacy exposure to a wide array of private credit opportunities. The main ones at the end of 2023 were Blocktower S3 and S4 (structured credit), a participation in mortgages from HVB (community bank in the US) and New Silver (fix and flip real estate loans). This also includes the Coinbase Custody facility where USDC is deposited on Coinbase Custody to earn rewards. It is flagged as private credit due to the added credit exposure to Coinbase and to highlight the lower liquidity compared with directly holding stablecoins (next category).

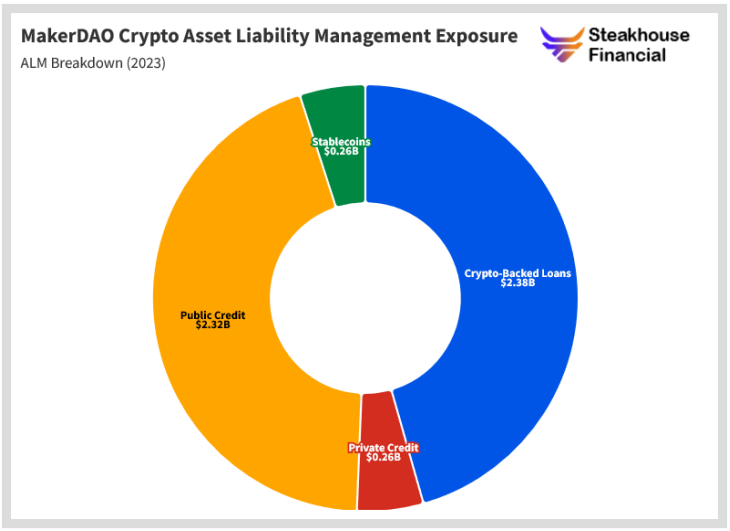
- **Stablecoins**: Stablecoins (mainly USDC) held in Pegeg Stability Modules (PSMs) where third parties can swap Dai for the stablecoin and vice versa. These are the most liquid assets that Dai can be swapped for.

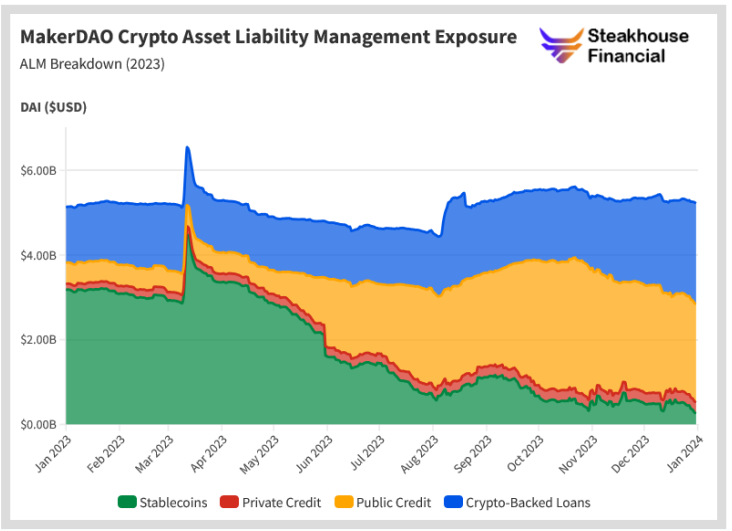
4.2. Balance Sheet Exposure

Throughout 2023, the balance sheet exposure shifted from predominantly stablecoins to public credit. This was a deliberate decision by Maker Governance to increase exposure to T-bills through Clydesdale, then Andromeda. The move was favorable not only in terms of returns, but also from a risk perspective, given T-bills are viewed as less risky than stablecoins.

While stablecoin exposure declined overall during the year, there was a sharp spike in March 2023 following the USDC de-peg and SVB collapse. The event motivated USDC holders to exchange their "at risk" USDC for Dai. With the resolution of the SVB incident, exposure quickly reverted.

Finally, in the last quarter, increased crypto-backed loan exposure, driven by improved sentiment and crypto asset prices, necessitated a partial reduction in the public credit exposure.

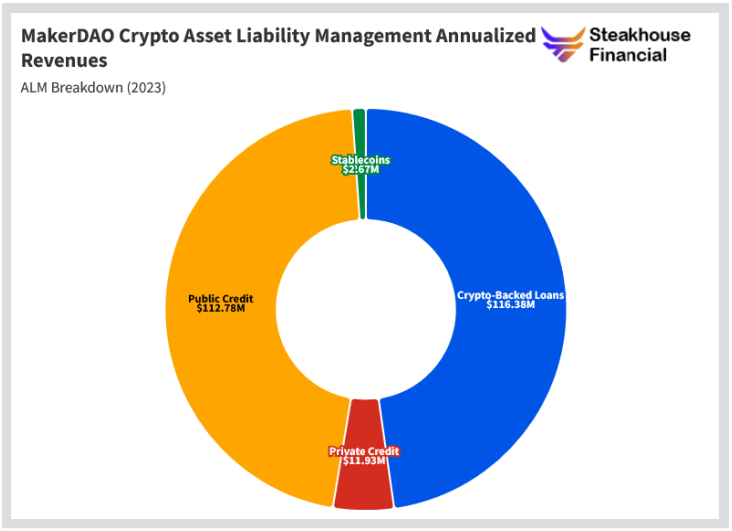


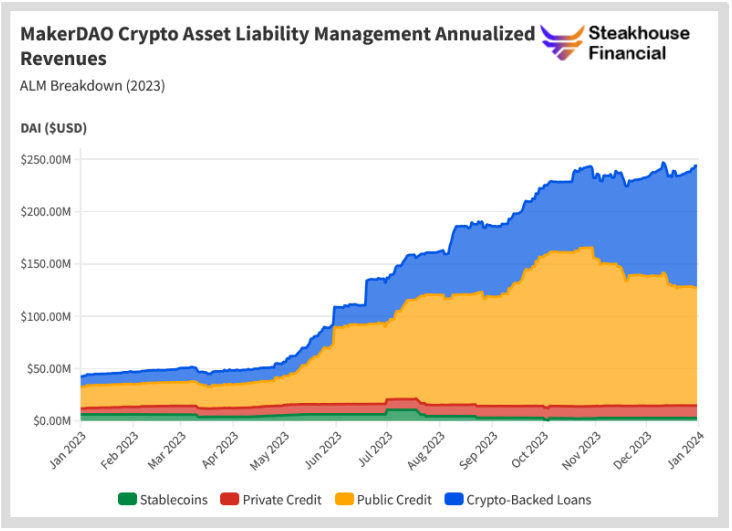


4.3. Revenues

While total exposure remained relatively stable during the year, annualized revenues experienced a significant increase, rising from 42 million Dai at the beginning of the year to 243 million Dai by year-end. This surge was attributable to two key factors. First, the strategic transition from non-yielding stablecoins to T-bills, yielding more than 5%, augmented protocol income.

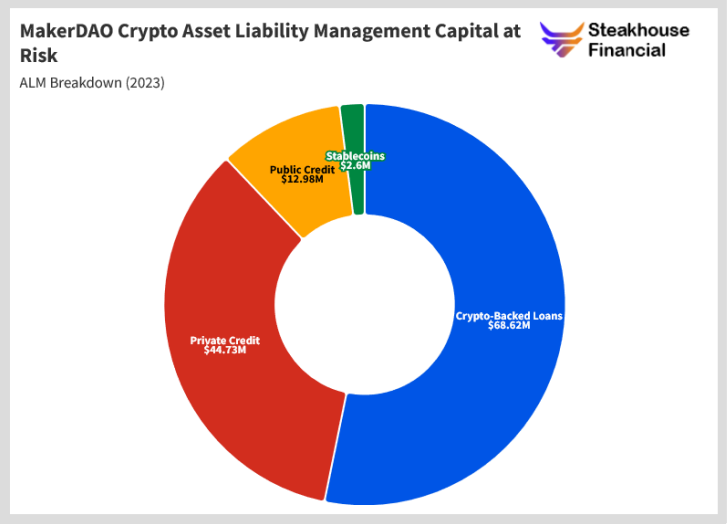
Moreover, in the final quarter, a portion of the public credit exposure shifted toward crypto-backed loans, which offer even higher yields.

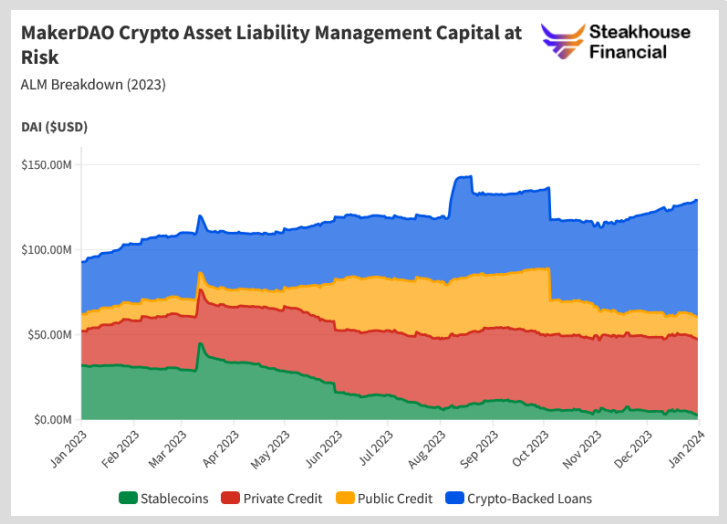




4.4. Capital At Risk

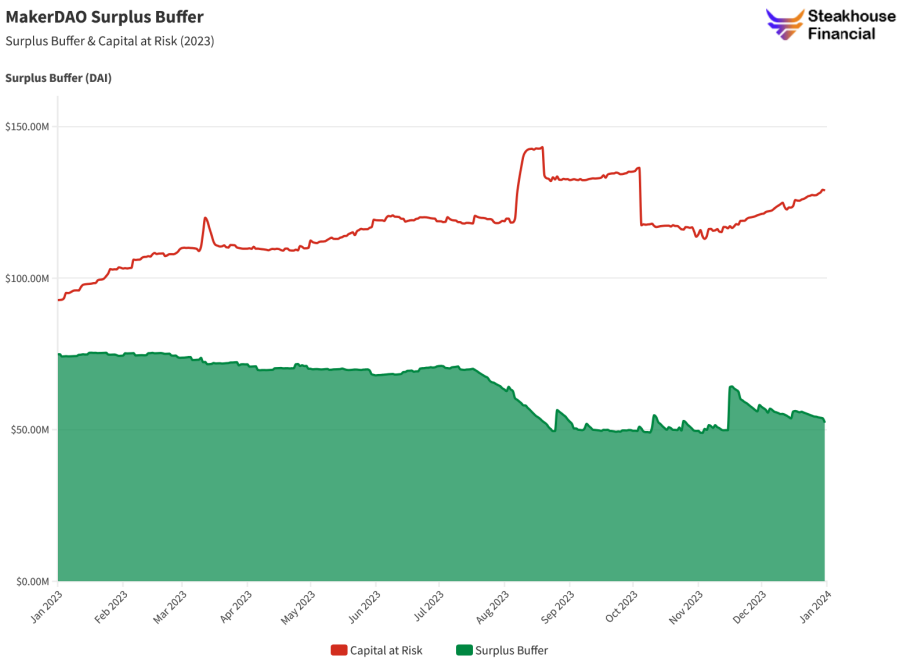
Capital at risk saw a slight increase during the year. First, private credit exposure increased due to the previously approved collateral onboardings (140 million to 263 million Dai), significantly adding to the risk metric, as private credit incorporates credit and duration risk. The metric also increased for public credit, due to the higher exposure mentioned above. In early October, the allocation of Clydesdale was changed and longer duration ETFs were sold for a 6-month T-bill ladder, leading to a sharp decrease in public credit risk. Finally, an increase in crypto-backed loan exposure is also increasing overall risk as they are higher risk in the ALCO model than T-bills.





4.5. Solvency

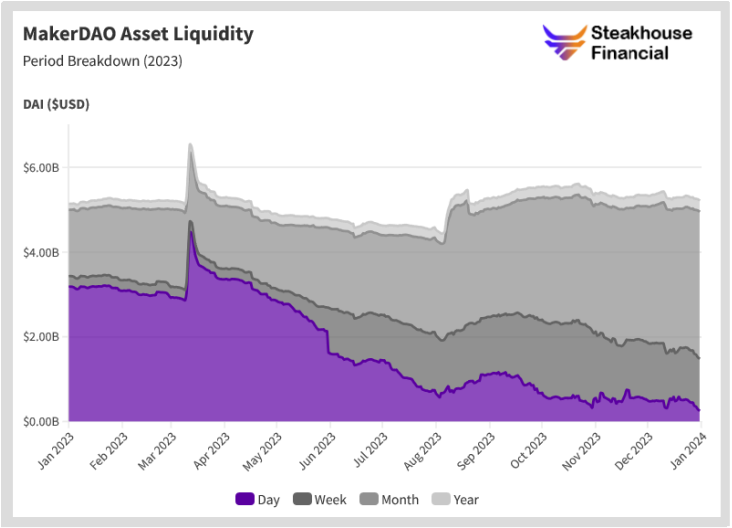
The increase in capital at risk during the year was not matched by an increase in the Surplus Buffer. In fact, the Surplus Buffer declined. Starting in July 2023, Maker Governance decided to reduce the maximum level of the Surplus Buffer to 50 million Dai and use any excess to buy MKR on the market to activate the Smart Burn Engine. Capital at Risk is still an area of research and was introduced after the Smart Burn Engine. As the Capital at Risk metric gets finalized, the Maker community will have to decide to match the surplus buffer to it or continue the Smart Burn Engine as of today. It is also important to note that MakerDAO maintains a MKR/DAI LP that isn't counted as surplus due to its pro-cyclicality but could be unwound and increase the Surplus Buffer should the community desire.

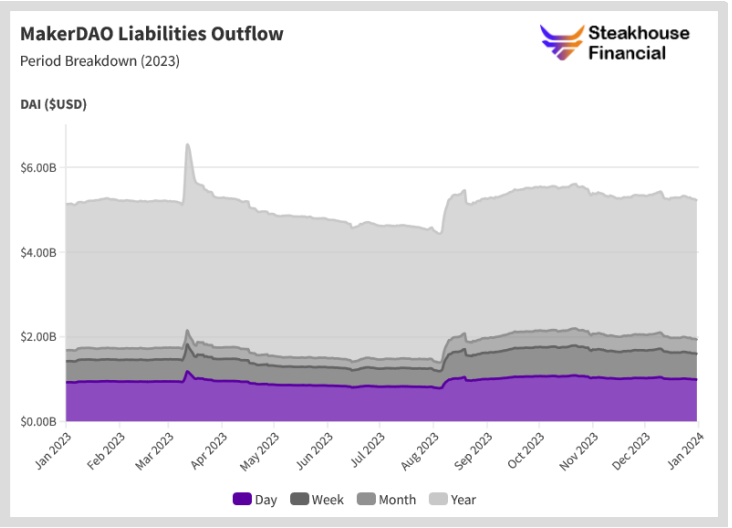


4.6. Liquidity

Turning to liquidity adequacy, the shift from stablecoins to public credit reduces the liquidity of the asset side of the balance sheet. T-bills are obviously quite liquid instruments; nevertheless, they don't trade on the weekends which excludes them from the Daily maturity bucket. Due to the complexity of the operations (involving fiat rails), it appeared prudent to the ALCO to put 50% of the T-bills exposure in the weekly bucket and 50% in the monthly bucket. Experience showed that while a week is usually sufficient, it was not always the case. Arrangers and banking partners are working to optimize this state. After further analysis, the ALCO may reflect the improvements in the assumed liquidity profile of these assets.

On the liabilities side of the balance sheet, there were limited changes. While the amount of Dai in the DSR increased and would be considered as "speculative Dai" as it is a smart contract, it exacerbated the decline of Dai in DeFi as defined by Dai locked in DEX's and lending protocols.





All in all, at the end of 2023, with a sharp decrease in the liquidity profile of the assets and the stability of the liabilities, the Daily and weekly liquidity cumulative gap (cumulative difference between liquidity and modeled outflows over the maturity buckets) turned negative for the Daily and weekly buckets. We note that the weekly gap may be an output of the overly conservative liquidity assumption employed on the T-bill side. Nevertheless, the Daily gap is more concerning and has prompted ALCO to raise the issue to the DAO. Furthermore, a revised version of the Atlas was submitted in early 2024 to address this gap.

5. Future Governance: The Endgame Plan

The Endgame Plan is a proposal to overhaul and improve the governance and tokenomics of the Maker Ecosystem. Its primary aim is for the ecosystem to reach a self-sustainable equilibrium called the Endgame State. In this state, the ecosystem is resilient, and the scope and complexity of Maker Core will no longer change. In practice, it is envisioned to result in a simplified Maker Core, with complexity and innovation handled and created by SubDAOs.

The Endgame Plan was introduced by Rune Christensen, the co-founder of Maker. After a series of initial discussions, Maker Governance accepted the MIP set ratifying this plan on October 24th, 2022. The Endgame Plan remains in active development.

5.1. Core Elements

The Endgame Plan consists of the following primary components, described in further detail in the subsequent section:

- Maker Atlas
- SubDAOs
- Scopes and Scope Artifacts
- Aligned Voter Committees & Aligned Delegates
- Tokenomics

Maker Atlas
The Atlas is the foundational set of rules that govern MakerDAO. Together with the 'Scope Artifacts', the Atlas outlines the motivation, structure, roles, tokenomics, and desired outcomes of the Endgame Plan, as well as the operational framework of the DAO.

The Atlas is currently under active development. It will become immutable upon Maker reaching the Endgame State, serving as the ultimate authority for governing the DAO. The Atlas is the best resource for details regarding the Endgame plan. We encourage interested parties to read it and revisit periodically as the project progresses.

SubDAOs
The Endgame Plan will organize the decentralized workforce into independent and self-sustaining SubDAOs, each with its own governance token, processes, workforce and interfaces. The SubDAOs are designed to be more agile and foster innovation within their chosen domains, while aligning with Maker Core through tailored incentive structures. This planned decentralization is expected to enhance the resilience of Maker Core, allowing it to focus on governance, while SubDAOs drive innovation and execution within the ecosystem.

Allocator SubDAOs
Allocator SubDAOs manage governance-approved collateral assets that back NewStableToken (NST, a rebranded Dai fit for the new MakerDAO Endgame ecosystem), eliminating the need for native Vaults. They come in two forms: those focused on crypto-native assets (e.g., Spark SubDAO), and those focused on Real World Assets (e.g., the Qualitative and Quantitative SubDAOs).

RWA Allocators focus on investment-grade public and private credit in both on-chain and off-chain formats. They will also be supported by Ecosystem Actors, who are professionals engaged to help bootstrap and support SubDAOs. An example of support provided by an Ecosystem Actor is the creation of an 'Arranged Structure', which is a legal

structure that specializes in the sourcing, negotiating, structuring of, and reporting on RWAs.

- ***Spark SubDAO & Protocol***
  Spark is a Dai-centric money market protocol. It is a fork of the Aave v3 codebase and shares 10% of profits with the AaveDAO. Spark Protocol enables users within the Maker ecosystem to cross-collateralize their crypto borrows, a feature that is unavailable in the Maker Protocol directly. It also enables Maker to gain exposure to the peer to peer lending market. SparkDAO owns and manages Spark Protocol through decentralized governance.

- ***Qualitative SubDAO***
  The Qualitative SubDAO is an Allocator SubDAO specializing in private credit and bespoke underwriting. It seeks to collaborate with parties sharing a vision for blockchain technology's potential to revolutionize traditional financial infrastructure. With a focus on Asia Pacific, it targets emerging crypto friendly regulatory environments such as South Korea, Singapore and Hong Kong, which could become globally-competitive crypto hubs. Over time, the aim is to expand its geographic focus as regulatory environments evolve globally.

- ***Quantitative SubDAO***
  The Quantitative SubDAO is an Allocator SubDAO that manages the collateral that backs Dai/NST. It focuses on allocating Real World Asset (RWA) collateral at scale and in an automated, rules-based manner. This SubDAO looks to blend traditional finance (TradFi) know-how with DeFi technical expertise to bring TradFi assets and markets on-chain. The initial focus is on delivering a fully automated, transparent, rules-based allocation system to on-chain public credit (e.g., US Treasuries) powered by smart contracts and underpinned by NewBrandDAO governance and Maker Core liquidity.

- ***Sakura SubDAO***
  The Sakura SubDAO is a beginner-friendly place intended for new users to earn rewards on their cryptocurrency through simple DeFi farms and explore interesting content with a like-minded community.

Scopes and Scope Artifacts

A Scope is a broad focus area that improves the protocol. Scopes were introduced to limit scope creep and ensure that any work done aligns with Maker Core's overarching goals. Maker Core consists of **five Scopes**. They are:

- **Governance Scope** codifies the rules related to decision-making within MakerDAO.
- **Support Scope** codifies the rules related to ecosystem support (e.g. SubDAO ecosystem support, Public Good Purpose System).
- **Protocol Scope** codifies the rules related to the technical aspects of MakerDAO.
- **Stability Scope** codifies the rules related to managing Dai and financial stability (e.g. the Surplus Buffer).
- **Accessibility Scope** codifies the rules related to distribution (i.e. user-facing frontends of Maker Core and SubDAOs).

Each Scope has a set of rules, known as 'Scope Artifacts', which SubDAOs must follow. Scope Artifacts will be refined over time to enhance sustainability and reduce risk to Maker Core. Scope Artifacts limit the governance overhead by ensuring that Maker Core can focus solely on high-level decisions.

Aligned Voter Committees

Aligned Voter Committees (AVCs) are organized groups of MKR token holders that actively participate in Maker governance. Their main tasks are to propose scope Artifacts modifications for continuous improvement and to ensure affiliated Aligned Delegates (ADs) execute the AVC's strategic vision when voting on governance issues. Compensation mechanisms are in place for AVCs in order to incentivize engagement and commitment.

Aligned Delegates

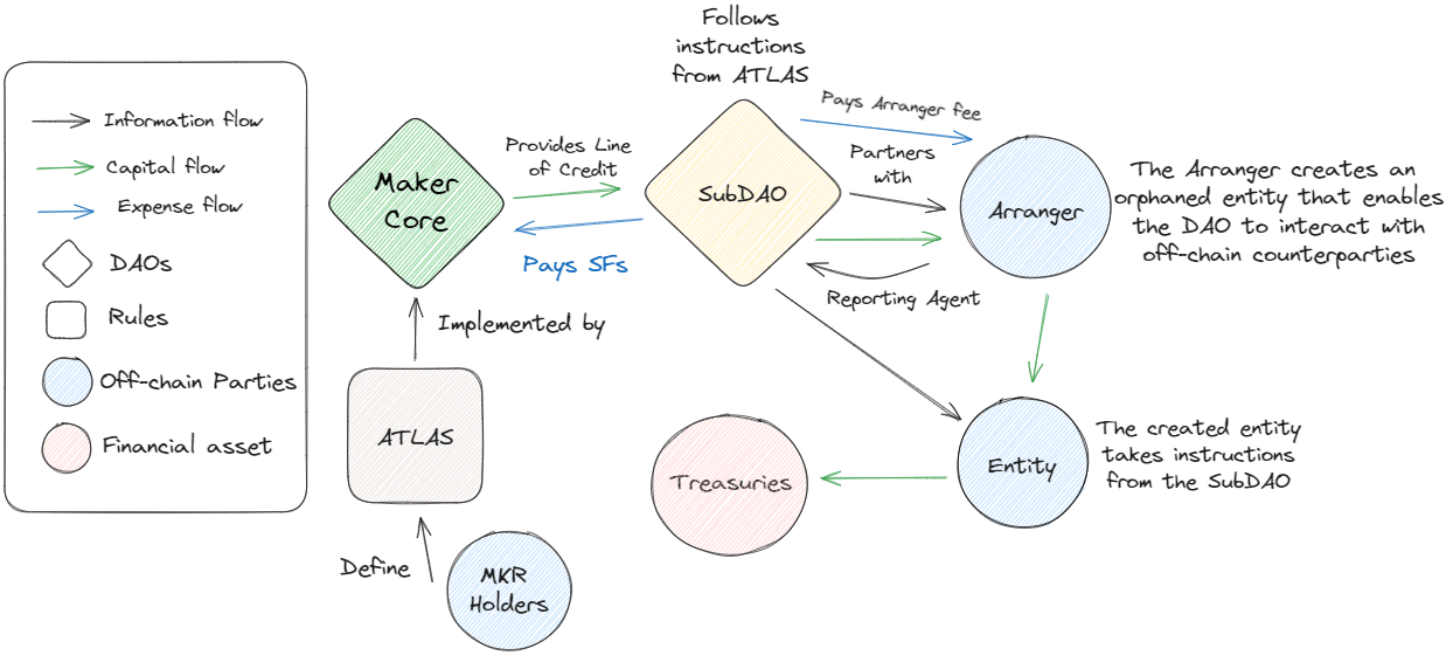
Aligned Delegates (ADs) are Maker ecosystem participants who receive delegation by MKR token holders. Any user can become an AD by setting up a delegate account and using the Protocol Delegation Module (PDMs) which facilitates MKR holders to delegate their voting power. The role of ADs is to support and execute AVC strategies.

They may do this by providing governance information and research material, assisting with Scope Improvement Articles, and research relevant Maker ecosystem developments. ADs execute AVC strategies, but do not participate in their creation to mitigate misalignment risks.

The synergy between AVCs and ADs is pivotal. While AVCs ensure that decisions are collective, informed, and aligned, ADs ensure that these decisions are actionable, effective, and responsive. They work in tandem, each enhancing the effectiveness of the other.

5.2. Endgame Flows - RWA AllocatorDAO Example

The below graphic provides a simplified illustration of how information, capital, and expenses flow between MKR holders, Maker Core, a RWA AllocatorDAO, and an Arranger Ecosystem Actor.



MKR holders (including and especially Aligned Delegates) define and use their power to protect the spirit of the Atlas and maintain Universal Alignment of the Maker Ecosystem. Professional Ecosystem Actors at Maker Core, implement the specifications set out by the Atlas. Maker Core extends capital to Allocator Vaults (SubDAOs) according to specifications and risk parameters defined in the Stability Scope. The SubDAO partners with an Arranger to facilitate the creation of a decentralized entity – which in this example takes the form of an orphaned entity that only takes instructions from a SubDAO. The SubDAO and Arranger leverage the entity to enable access to traditional financial assets, such as short duration US Treasury Bills.

5.3. Tokenomics

Overview

The Endgame Plan has several major tokenomics updates, as part of the new 'Neural Tokenomics.'

First, the Endgame Plan modifies the MKR burn mechanism. The protocol will use income to purchase liquidity pool tokens representing liquidity pools holding various combinations of MKR, Dai, and SubDAO governance tokens. The aim of these token purchases is to ensure alignment of interests between Maker Core and SubDAOs.

Second, annual MKR minting will be used to incubate SubDAOs, fund Aligned Voter Committees (AVCs), and incentivize the workforce. These emissions counteract the burn mechanism and reduce the likelihood of MKR becoming concentrated in the hands of large holders.

Third, users may lock up their MKR in a new module but continue to use it to participate in governance. Such locked-up MKR is eligible for Dai and SubDAO token farming rewards. When users wish to unlock their MKR from this module, a percentage of their initial deposit is burned.

Maker Core Emissions

Through the new Neural Tokenomics, 2B NewGovTokens (83K MKR) will be emitted annually, mostly offset by 1.8B of NewGovTokens (75K MKR) recaptured within the Maker Ecosystem as follows for a net of approximately 0.9% in emissions. The 200mm of net NewGovTokens (8.3K MKR) emissions will be distributed through various NST (Dai) farms.

Emission Type	Amount (mm)	Amount (%)	Emission Reason
AllocatorDAOs	920	46%	Based on Elixir holdings
FacilitatorDAOs	300	15%	Responsibility Reward System
FacilitatorDAOs	240	12%	Based on Elixir holdings
Future SubDAOs	140	7%	SubDAO Incubator Reserve
Prime Delegates	60	3%	Protect spirit of the Atlas and maintain Universal Alignment
Purpose System	60	3%	Fund public good open source AI and software projects
Staking Rewards	40	2%	Validator staking rewards to secure NewChain
Reserve Delegates	20	1%	Protect spirit of the Atlas and maintain Universal Alignment
AVC Member	20	1%	Governance Strategy and Scope Proposals
Recaptured Total	**1800**	**90%**	
NST Farmers	200	10%	NewStableToken (Dai) Farms
New Net Emissions	**200**	**10%**	
Grand Total	**2000**	**100%**	

SubDAO Emissions

There are two classes of SubDAOs, major SubDAOs and minor SubDAOs, each with their own unique tokenomics. Major SubDAOs come in two forms AllocatorDAOs and FacilitatorDAOs, and minor SubDAOs currently have one form, MiniDAOs.

Major SubDAOs have a token supply of 4.6 billion, with 4 billion (87%) of the token supply being emitted for the Genesis farming over 10 years. The remaining 600 (13%) million tokens are allocated to the workforce bonus pool. 70% of the Genesis farming emissions will be emitted through a NST (Dai) farm, with the remaining 30% emitted through a NGT (MKR) farm. AllocatorDAOs and FacilitatorDAOs also have a permanent emission of 10% and 12.5% of the token supply per year respectively, primarily to farming initiatives.

Mini SubDAOs have a token supply of 1.84 billion, with 1.6 billion (87%) of the token supply also being emitted for Genesis farming over 10 years. The remaining 240 million tokens are allocated to the workforce bonus pool. Where MiniDAO emissions differ is through the farming distribution. 15% of all MiniDAO tokens emitted through NST (Dai) farming, 35% of all MiniDAO tokens emitted are for farmers of the parent AllocatorDAO token, and 50% of all MiniDAO tokens emitted are for parent AllocatorDAO Lockstake Engine users.

The Genesis farming emissions schedule is heavily weighted to the first several years of farming, with 50% of tokens (2 billion for SubDAOs, 800 million for MiniDAOs) emitted during the first two years. 25% are emitted over the following two years, 12.5% the subsequent two years, then the remaining 12.5% over four years.

These farming parameters will make the SubDAO launches some of the most fair token launches in the blockchain industry's history, as many projects have large insider, team, and investor allocations.

For a detailed description of Maker's Endgame Scopes, see Appendix B below. Please note that the Endgame plan is still under development and certain details may be subject to change.

6. Other Resources

- https://makerburn.com
- https://dune.com/steakhouse/makerdao
- https://dune.com/steakhouse/stablecoins
- https://dune.com/steakhouse/makerdao-alm
- https://dune.com/steakhouse/makerdao-clydesdale
- https://dune.com/steakhouse/makerdao-andromeda
- https://forum.makerdao.com/u/steakhouse/activity/topics

6.1. Dune Queries

- MakerDAO Revenues Evolution
- DSR Balance & DSR Rate
- DSR Balance & Total Balance
- MakerDAO Onchain Revenues
- MakerDAO Rates Evolution
- Spark Supply Total Value Locked
- Spark Borrow Total Value Locked
- ETH/stETH Lending - ETH Mainnet
- WBTC Lending - ETH Mainnet
- Dai Wallet Distribution Monthly Distribution - Monthly Excl. Wallets < 100 Dai
- Dai HODL Wave
- MKR Wallet Distribution
- MKR HODL Wave
- MKR/Dai Protocol Owned Liquidity Pool
- MKR/Dai Protocol Owned Liquidity Impermanent Change
- MakerDAO Crypto Asset Liability Management Exposure Pie
- MakerDAO Crypto Asset Liability Management Exposure OverTime
- MakerDAO Crypto Asset Liability Management Annualized Revenue Pie
- MakerDAO Crypto Asset Liability Management Annualized Revenue Over Time
- MakerDAO Crypto Asset Liability Management Capital at Risk Pie
- MakerDAO Crypto Asset Liability Management Capital at Risk Over Time
- MakerDAO Surplus Buffer
- MakerDAO Asset Liquidity
- MakerDAO Liabilities Outflow
- MakerDAO Dai Liquidity Profile

Appendix A: Overview of Accounting Standards (Maker GAAP)

The figures in this report are illustratively organized to show what MakerDAO's financial position resembles economically speaking. However, there is no single entity that collects the below results or speaks for its figures. The smart contracts that regulate peer-to-peer interactions are permissionless and the protocol accumulates and spends surpluses to maintain the equilibrium of the system.

We collect smart function calls and events from Dune in a master query (dune.steakhouse.result_maker_accounting) that classifies each transaction into a place in a virtual chart of accounts. This query is publicly available and underpins not only our work, but the work of other leading researchers in the space, including Blockworks Research. We are mapping these function calls based on the closest available parallel in traditional accounting. It is important to note that distributed ledger transactions can be meaningfully different from their traditional counterparts and these mappings should be taken with a grain of salt.

To that end, given the public and open nature of blockchain transactions on Ethereum, it is possible for anyone to query the same transactions for themselves and make their own mappings. Nevertheless, we believe these to be the first major set of crypto-GAAP standards made publicly available.

What we call the canonical view is everything that is reflected on-chain and has changed the state of the blockchain. This is a straightforward matter as far as crypto collateral is concerned.

The problem arises with real-world transactions that take place off-chain and may accrue over several months before being reflected on-chain. We have tried to solve this problem by showing a second set of pro-forma financial statements that capture the activity that has taken place off-chain, as a way of showing a reasonable approximation of the economic state of the protocol. However, this is an imperfect stopgap.

In our view, there are two fundamental business models of relevance in our industry:

1) Traditional companies with a crypto-component, which may make use of the blockchain to disintermediate industries and use the margin released to either build a better product or gain share by offering the same product at a lower price
2) Pure crypto protocols which aim, over time, to become thin application layers to mediate peer-to-peer transactions with minimal human interaction

Our team is mostly interested in developing the equivalent of a crypto-GAAP standard for financial reporting and transparency for the latter case. With the work we have done on Maker, to our knowledge, our team is the first to have mapped out a top protocol fully with a double-entry accounting ledger.

The data is available freely on Dune and we invite the community to contribute and comment. We believe an open approach to implementation is the best way to roll out crypto accounting standards, which should be the primary way that self-regulation can demonstrate the value of transparent financial record-keeping.

We are aware that our team's data publications and Dune queries are already being recycled in commercial research publications around the industry. There is nothing preventing these players from also repackaging our crypto GAAP work and reselling it to their subscribers.

To the extent commercial firms do end up building on top of our crypto-GAAP queries, or portions thereof, we would kindly request voluntary ongoing donations of part of their subscription revenue attributable to MakerDAO reports, to be sent to the Maker Pause Proxy address (`0xBE8E3e3618f7474F8cB1d074A26afFef007E98FB`) to support the development of open source crypto protocols.

We are passionate about showing how we can do better than mandatory quarterly paperwork: real-time transaction transparency and an open standard for classification.

Appendix B: Endgame Scopes

This section provides a more detailed description of Maker's Endgame Scopes. Understanding the Endgame and its Scope is critical for MKR holders who desire participating in the Maker Ecosystem and community. There are **five scopes**, the Governance Scope, Support Scope, Protocol Scope, Stability Scope, and Accessibility Scope. We've condensed the content within these scopes, as outlined in the Maker Atlas and in some instances may oversimplify or exclude relevant information. We highly encourage readers to review the Endgame documentation itself to solidify their own understanding.

The **Governance Scope** delineates the rules managing the balance of power and decision-making processes within MakerDAO. It includes mechanisms for addressing misalignment *(when it is possible to prove that an actor does not possess Universal Alignment or acts in a way that goes against Universal Alignment)* in the ecosystem.

The Governance Advisory Council, composed of vetted Ecosystem Actors, plays a central role in refining governance structures, ensuring they are robust, transparent, and equitable. This scope is pivotal in maintaining the integrity, accountability, and effectiveness of governance processes, ensuring that decisions are made with consideration for the entire ecosystem's health and sustainability while adapting to emerging challenges and opportunities.

The key specifications of this scope include:

1. An **Advisory Council** that is able to propose improvements to the language of the Mutable Alignment Artifact that increase efficiency and security of the Maker Ecosystem
2. The **Scope Mutable Alignment Artifacts** (Scope Artifacts) which specify how Maker Governance operates, within the constraints and boundaries set by the Atlas
3. The **Alignment Conserver** role – external entities that protect the Maker Governance process by ensuring it occurs according to the processes defined in the Maker Core Alignment Artifact (a document to facilitate aligned actor coordination). Alignment Conservers can take the form of:
    a. **Aligned Voter Committee (AVC) Member**
    b. **Aligned Delegate**
    c. **Facilitator**
    d. **Budget Allocator**
4. The creation of **Aligned Voter Committees**, which are made up of Alignment Conservers that hold MKR and participate in the Maker Governance process as actors that are deeply aligned with MKR holders. They are subject to specific requirements, and receive various benefits, resources, and support from the Support Scope:
    a. The **core task of the AVC** is the **quarterly creation** of an up to date ratified **Aligned Governance Strategy** and up to date ratified **Aligned Scope Proposals** for each of the five Scopes.
    b. A critical governance interaction is the AVC getting professional input from Advisory Council Members about specific improvements that are possible in the Scope Alignment Artifacts. This happens with the FacilitatorDAOs following the instructions defined in the Advisory Council Articles. FacilitatorDAOs can also provide input directly to AVCs.
    c. **AVCs must fulfill eligibility requirements**; new ones can become recognized after participating in internal governance for at least one full quarterly governance cycle.
    d. To remain Active, an AVC must follow a standardized internal governance process for determining membership, creation of Aligned Governance Strategy, Aligned Scope Proposals and other decisions.
    e. AVC must represent the interest of MKR holders, and **cannot represent or be closely affiliated with an external entity**. AVCs must always operate with awareness of members' conflict of interest and take all reasonable steps to make sure that their alignment is preserved.
    f. The yearly total AVC Member **participation rewards are 20 million NewGovToken (833 MKR)**. This amount is broken into tranches of 1 million NewGovToken (42 MKR) for each Scope per quarterly governance cycle, and shared across reward slots for that Scope.
5. **Aligned Delegates (ADs)** are Alignment Conservers that have registered based on the processes specified in the Governance Scope Artifact. ADs receive various benefits while being subject to specific requirements in addition to the general Alignment Conserver requirements.

    a. There are two income levels for ADs: **Prime Delegates (PDs)** that receive the highest level of income and have a degree of income security, and **Reserve Aligned Delegates (RDs)** that receive a lower level of income.
    b. The Governance Scope Artifact specifies the number of PD slots, and the number of RD slots. There is always an equivalent amount of each. The amount of slots are increased or decreased proportional to the change in the AD income baseline.
    c. Actual AD income payouts are modified based on the requirement to have a minimum amount of participation in AVC Subcommittee Meetings. PDs must participate in at least 85% of the AVC Subcommittee Meetings. RDs must participate in at least 50% of the AVC Subcommittee Meetings
    d. ADs must maintain a high level of operational security, and follow best practice for privacy, security and physical resilience. This must be done at a level that adequately protects the Maker Ecosystem from physical risk posed by the potential for attacks against ADs.
    e. Aligned Delegates are expected to provide crucial support to AVCs in the domains where they are the most aligned actors.
    f. It is encouraged that ADs compete and campaign on their ability to achieve some level of charitable impact with the resources available to them, in order to demonstrate alignment with the public good purpose of the DAO.
6. **FacilitatorDAOs** are a type of SubDAO that can be given responsibility over MakerDAO Scopes and SubDAO Scopes in return for token rewards.
    a. The Governance Scope must specify a process used by Maker Governance to assign responsibility of a particular MakerDAO Alignment Artifact to a particular FacilitatorDAO.
    b. All FacilitatorDAOs always have responsibility for the Governance Scope.
    c. There must always be a FacilitatorDAO assigned to all Scopes, and if necessary due to extraordinary circumstances, Maker Governance must directly assign responsibility of a Scope to a FacilitatorDAO.
    d. If a FacilitatorDAO has responsibility for the Support Scope or the Stability Scope, they are considered Core Facilitators and cannot be assigned responsibility to SubDAO scopes.
    e. FacilitatorDAOs benefit from a special tokenomics system called FacilitatorDAO Responsibility Rewards, which rewards them based on the amount of Responsibility they have over Scopes.
    f. A total of 300 million (12,500 MKR) NewGovToken are distributed to all FacilitatorDAOs per year.
        i. 120 million for responsibility of MakerDAO Scopes.
        ii. 180 million for responsibility of SubDAO Scopes.
7. **Facilitators** are anonymous Alignment Conservers that can be engaged by FacilitatorDAOs to directly access governance processes and smart contracts that the FacilitatorDAOs control, to help ensure the FacilitatorDAO fulfills their responsibility under the Alignment Artifacts.
8. **Professional Ecosystem Actors** are external actors that are paid through the Scopes to do important work that benefits the MakerDAO ecosystem. **Two types** of Professional Ecosystem Actors exist: **Advisory Council Members** and **Active Ecosystem Actors**.
9. Specifies **Governance Security** processes for deploying and reviewing executive votes, as well as minimum security rules related to SubDAO governance actions.

The interactions between AVCs, ADs and FacilitatorDAOs define how Maker Governance operates from the highest level of informing long term AVC strategic perspectives, to the lowest level of reactively modifying risk parameters or funding individual projects.

Before the Endgame State is reached, the Governance Scope articles must be modified to accommodate the needs of the bootstrapping phase leading up to the Endgame State, and to minimize transition costs and friction. The Governance Scope must also contain processes for quickly fixing issues in any scopes that put the bootstrapping of governance at risk.

The **Support Scope** outlines the guidelines governing ecosystem support tasks, including the management of governance processes, SubDAOs, Ecosystem Actor support, and the Public Good Purpose System. A council of approved ecosystem actors, the Support Advisory Council, plays a crucial role in this scope. They are responsible for ensuring that the support mechanisms are efficient, responsive, and aligned with the overarching objectives of MakerDAO. This scope is instrumental in fostering a supportive environment that facilitates seamless operations, governance, and the continuous enhancement of the MakerDAO ecosystem.

The key specifications of this scope include:

1. Defining processes necessary for the Scope to **reliably be improved long term** without risk of misalignment.
2. Ensuring Maker Governance processes function smoothly and reliably, **making governance participation attractive and user friendly.**
3. Development of a 'DAO Toolkit,' **a unified system for displaying the Alignment Artifacts and all of the data,** processes and interaction necessary for Maker Governance and internal SubDAO governance to function optimally.
4. Creation of a **cutting edge system of diversified AI tools** that is accessible by Alignment Conservers and **tokengated** for MKR holders and SubDAO token holders.
5. Defining reporting standards to set a solid baseline understanding of how to measure and monitor results, and how to distinguish between goals that actually benefit the DAO and goals that are misaligned.
6. How **new SubDAOs are continuously created** according to the core protocol logic of NewChain, and how the support scope can ensure the **necessary infrastructure** is available to maximally support this incubation process.
7. Ensuring the proper elements are in place to **incubate relevant Ecosystem Actors** that can **support the new SubDAOs.**
8. Defines the overall **unified communication infrastructure** used for governance ecosystem communication, including channels for inter-SubDAO communication and Ecosystem Actor interaction.
9. **Standardize how Ecosystem Agreements work**, to make it as convenient and easy as possible for Ecosystem Actors to do business in the Maker Ecosystem **with guardrails and fair treatment**.
10. Researching how to make the protocol more resilient.
11. Creation of the **'Purpose System'** to fund public good open source AI and software projects that benefit the Maker Ecosystem and public good.
    a. **60 million NewGovToken (2,500 MKR)** are emitted per year for the Purpose System once NewChain is launched

The **Protocol Scope** encompasses improvements and advancements within the MakerDAO protocol. The Protocol Advisory Council, consisting of approved Ecosystem Actors, is tasked with advising on enhancements to the Protocol Scope Artifact. This council is vital in steering the protocol's evolution, ensuring it remains robust, efficient, and aligned with the ecosystem's needs. Their focus extends to optimizing the protocol's features and functions, making it more responsive and adaptable, thereby contributing to the overall resilience and innovation within the MakerDAO ecosystem.

The key specifications of this scope include:

1. **Development of a 'NewChain'** that contains the complete Endgame specification - its deployment signifies the Maker Ecosystem has reached the Endgame State.
2. Defines the **requirements of NewChain**, including:
    a. Native delegation compatible with the Lockstake Engine
    b. State rent
    c. Gas fees and state rent paid by NewGovToken, and staking done with NewGovToken
    d. Native protocol MEV capture
    e. Native ZK rollups built into the protocol
    f. 'Neural Tokenomics' and core governance processes built natively into the protocol
3. Implementation of internal **governance mechanics,** incubation mechanics, and tokenomics of MakerDAO and SubDAOs
    a. Incubation system that creates new:
        i. AllocatorDAOs if there are less than five, or if ≥ ⅓ of all major SubDAOs are FacilitatorDAOs
        ii. FacilitatorDAOs if there are less than three, or if they are ≤ ⅓ of all major SubDAOs
    b. If 8 or more SubDAOs exist, then a new SubDAO is incubated at a time interval since the last SubDAO incubation. The interval in years is equivalent to the larger number of 1 or (number of SubDAOs divided by 16)^1.5.
4. **Native NewStable farms** for farming NewGovToken and SubDAO tokens including:

    a. Free Token Farming - This mode of farming gives the user tokens that are not lockstaked in the relevant lockstaking engine
    b. Free NFT Farming - This mode of farming embeds tokens into the users free NFT that is not lockstaked in the relevant lockstaking engine
    c. Lockstaked Token Farming - This mode of farming gives the user tokens that are lockstaked in the tokens native lockstaking engine
    d. Lockstaked NFT Farming - This mode of farming embeds tokens into the users lockstaked NFT that is lockstaked into the tokens native lockstaking engine
5. **Maker Lockstake Engine** - enables users to lock up NewGovToken or an NFT embedded with NewGovToken
    a. When lockstaked, NewGovTokens can farm any of the Major SubDAO tokens, or Dai from the Maker Surplus Buffer. The SubDAO tokens can be farmed either as free tokens, free NFTs, or Lockstaked NFTs.
6. **Facilitator Lockstake Engine** - enables users to Lockstake an NFT embedded with FacilitatorDAO tokens
7. **Allocator Lockstake Engine** - enables users to Lockstake an NFT embedded with AllocatorDAO tokens
8. **MiniDAO Lockstake Engine** - enables users to Lockstake an NFT embedded with MiniDAO tokens
9. All Lockstake Engines have an **exit fee** which is used to **yield boost** a pool that provide self-farming farming for each respective Lockstake Engine type
10. **NewGovToken Emissions** - Neural Tokenomics **emits up to 2 billion NewGovTokens per year** to power the tokenomics of the Maker Ecosystem. **MKR is convertible to NewGovToken at a ratio of 1:24,000** and vice versa. 2 billion NewGovTokens are equivalent to 83,333 MKR tokens.
11. **1.8 billion NewGovTokens (75,000 MKR tokens) are recaptured** to directly drive users or income to the Maker ecosystem in some form
    a. 920 million NewGovTokens (38,333 MKR tokens) to **AllocatorDAOs based on their Elixir holdings**
    b. 300 million NewGovTokens (12,500 MKR tokens) to **FacilitatorDAO Responsibility Reward system**, where it is distributed to FacilitatorDAOs based on their Scope Responsibilities
    c. 240 million NewGovTokens (10,000 MKR tokens) to **FacilitatorDAOs based on their Elixir holdings**
    d. 200 million NewGovTokens (8,333 MKR tokens) to **Dai (NewStable) farms**
    e. 140 million NewGovTokens (5,833 MKR tokens) **to accumulate in the 'Incubators reserve burn engine'** which is used to fund the next SubDAO that launches
12. **200 million NewGovTokens (8,333 MKR tokens)** for Governance-related emissions
    a. 60 million NewGovToken (2,500 MKR tokens) for **Prime Delegates**
    b. 60 million NewGovToken (2,500 MKR tokens) for the **Purpose System**
    c. 40 million NewGovToken (1,667 MKR tokens) in **NewChain validator staking rewards**
    d. 20 million NewGovToken (833 MKR tokens) for **Reserve Delegates**
    e. 20 million NewGovToken (833 MKR tokens) in **Aligned Voter Committees**
13. **AllocatorDAO Emissions** - AllocatorDAOs have a genesis token emission that occurs over the first 10 years of its existence, and an additional permanent emission that occurs indefinitely
    a. 4.6 billion token supply
    b. 4 billion tokens for Genesis farming, emitted over 10 years
        i. 1 billion per year for first two years, 500 million per year for the next two years, 250 million per year for the following two years, and then 125 million per year for the remaining four years
        ii. **70% of AllocatorDAO tokens emitted for Dai (NewStable) farming**
        iii. **30% of AllocatorDAO tokens emitted for MKR (NewGovToken) farming**
    c. 600 million for the workforce bonus pool
    d. Permanent AllocatorDAO emissions of a total of **10% tokens emitted per year**
    e. FacilitatorDAO Genesis farming will have the same parameters as Allocators
    f. **Permanent FacilitatorDAO emissions** of a total of **12.5% tokens emitted per year**
14. MiniDAO token supply will be 1.84 billion tokens
15. MiniDAO Genesis emissions are 1.6 billion tokens over 10 years, distributed on the same cadence as Allocator and Facilitator DAOs
16. Elixirs are 50/50 LP tokens of the native AMM engine on NewChain. They have a prominent role in the Neural Tokenomics.
17. **Maker Elixir** is an LP token of 50/50 MKR/Dai. It is held by the Maker Smart Burn Engine, the Incubator, the AllocatorDAO Dendrites and the FacilitatorDAO Dendrites.

18. SubDAOs will each have their own forms of Elixir, pairing their token with MKR.
19. **Axons** are modules that distribute tokens of a parent DAO to its SubDAOs, split based on the SubDAO holdings of the parent's Elixir.
20. **Dendrites** are modules that receive incoming tokens from a parent DAO and convert it either to its own Elixir or to the parent's Elixir, determined by the Stability Scope.
21. **The Budget System** is a protocol module that enables token holders to set up budgets associated with Scopes, based on the specifications in the relevant Scope.
22. **The Budget Allocation System** is a mechanism that can be turned on and off by Maker Governance or SubDAO governance. It is a system that allows Budget Allocators to flexibly and quickly distribute budgets to FacilitatorDAOs that have good performance or are doing things that are strategically or tactically important.
23. **The FacilitatorDAO Responsibility System** is a module that lets MKR holders assign Responsibility for specific Scopes and its associated budgets. The weight of the Scope and the size of the budgets determine the rewards earned by the FacilitatorDAO from the FacilitatorDAO Responsibility Rewards.

The **Stability Scope** focuses on maintaining Dai's stability and utility. A specialized team, endorsed by Maker's governance, is committed to upholding Dai's value and security. Their role is pivotal in fostering trust, ensuring Dai remains a reliable asset for all users. The team is dedicated to refining strategies to enhance Dai's effectiveness, adaptability, and resilience. Every effort is concentrated on navigating the complexities of the financial landscape, ensuring Dai's continued role as a stable, accessible, and valued asset in the decentralized finance ecosystem.

The key specifications of this scope include:

1. **Predictable stability** relative to a suitable reference asset
2. **The Base Rate** - the base stability fee on Allocator Vaults and Lockstake Engine Vaults, determined algorithmically
3. **The Dai Savings Rate** - the rate at which Dai holders can earn rewards on Dai locked in the DSR smart contract
4. **Allocator Vaults** - native protocol modules that AllocatorDAOs can use to generate Dai
5. **Legal Recourse Assets** - off-chain assets used as Dai collateral that are enforced by *Arranged Structures*
    a. *Arranged Structures* are special legal structures set up by Ecosystem Actors to secure Legal Recourse assets to help stabilize the Maker Ecosystem
6. **Arrangers** - Ecosystem Actors that assist in the design and operation of Arranged Structures
7. **AllocatorDAO Junior Capital** - defines the required reserves to maintain access and use of the Allocator Vault
8. **Capitalization Requirements** - defines the minimum capitalization based on the asset liability management (ALM) categorization of the AllocatorDAO's assets
9. **Allocator Penalties** - defines the reasons an AllocatorDAO could suffer penalties and the penalties themselves
10. **Surplus Buffer and Smart Burn Engine** - defines processes for setting various economic parameters related to the Maker Protocol Surplus
11. **MKR Backstop** - defines parameters for recapitalizing the Maker protocol should the Dai stablecoin become undercollateralized
12. **Dai Stablecoin Decentralization** - specifies when and how collateral assets are shifted into decentralized collateral in the case of physical threats
13. **Lockstake Engine** - enables MKR holders to generate Dai based on the Maker Protocol's surplus
    a. **Dai Generation Risk Parameters** define the hard liquidation ratio, soft liquidation ratio, the sticky oracle, debt ceiling, and stability fee rate

The **Accessibility Scope** focuses on making MakerDAO easy to use and accessible to everyone. It oversees how users interact with MakerDAO Core and the SubDAOs' online interfaces. A special team, the Accessibility Advisory Council, approved by Maker Governance, gives advice on making these interfaces better. Their goal is to ensure that using MakerDAO is a smooth and straightforward experience for all users, enhancing the platform's user-friendliness and accessibility. They focus on improving existing features and introducing new, user-centric innovations to make MakerDAO more inclusive and easy to navigate for a diverse user base.

The key specifications of this scope include:

1. Defining the **brand identity** of Maker and processes for improving it
2. **Accessibility reward systems** for **third party front-ends and SubDAOs** to incentivize them to attract NewStable users, DSR users, SubDAO farm users, and Lockstaking Engine users
3. Specifying principles and processes for **managing the accessibility assets**, such as communication channels and communication presence on external websites
4. Defining principles and processes for **managing accessibility campaigns**
5. Specifying best practices for **SubDAO front-end standards** in terms of security, user experience and required features
6. **Designing of the Easy Governance Front-End (EGF)** that standardizes how users access the Lockstake Engine and its Governance Participation Rewards

Appendix C: 2023 Financial Statements–Pro-Forma View

in millions of Dai, unless otherwise stated	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***2023***
Consolidated Statement of Earnings													
Revenues													
Net trading fees	0.0	0.0	0.1	0.0	0.0	0.0	-	-	-	-	-	-	**0.1**
Net liquidation income	-	0.0	0.0	-	0.0	0.1	0.0	0.2	0.0	-	0.0	-	**0.4**
Total non-interest revenues	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	-	0.0	-	**0.5**
ETH	0.6	0.5	0.6	0.6	0.7	1.0	1.5	1.6	1.6	2.1	2.4	3.0	**16.2**
STETH	0.2	0.2	0.4	0.3	0.4	0.9	1.6	2.5	2.5	2.5	2.5	2.7	**16.7**
BTC	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.5	**3.6**
Liquidity Pool	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	-	-	**0.1**
Money Market	0.0	0.0	0.0	-	-	0.0	-	0.4	0.8	0.8	1.6	2.4	**6.0**
Other	0.0	0.0	0.2	0.0	0.0	-	-	-	-	-	-	-	**0.2**
PSM	0.5	0.6	0.6	0.5	-	1.4	-	1.1	2.1	5.5	3.4	0.3	**16.0**
RWA	2.8	1.0	5.5	2.9	0.4	4.3	3.0	8.2	8.4	14.4	13.5	11.7	**76.3**
Stablecoins	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Gross interest revenues	4.2	2.5	7.3	4.4	1.9	8.0	6.5	14.2	15.9	25.7	23.8	20.6	**135.1**
DSR	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.2)	(0.8)	(5.5)	(6.0)	(7.0)	(6.4)	(6.5)	**(32.7)**
Oracle gas expenses	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	**(0.5)**
RWA-related monitoring and setup costs	(0.0)	-	-	0.1	(2.3)	(9.7)	-	-	-	-	-	-	**(11.8)**
Direct expenses	(0.1)	(0.1)	(0.2)	0.0	(2.5)	(10.0)	(0.8)	(5.5)	(6.1)	(7.0)	(6.4)	(6.5)	**(45.0)**
Net interest income	4.2	2.4	7.1	4.4	(0.6)	(2.0)	5.7	8.7	9.9	18.7	17.4	14.1	**90.0**
Total net revenues	4.2	2.5	7.2	4.4	(0.6)	(1.9)	5.7	8.9	9.9	18.7	17.4	14.1	**90.5**
Accumulated sin from crypto-vaults	-	(0.0)	(0.0)	-	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	-	(0.0)	-	**(0.0)**
Operating expenses													
Direct to Third Party Expenses	(0.2)	(0.3)	(0.2)	(0.9)	(1.8)	(0.7)	(2.5)	(3.5)	(1.5)	(2.8)	(3.4)	(2.5)	**(20.1)**
Keeper Maintenance	-	-	-	-	(0.0)	(0.1)	(0.1)	(0.1)	(0.0)	(0.0)	(0.1)	(0.1)	**(0.4)**
Workforce Expenses	(1.8)	(2.1)	(4.2)	(3.5)	(2.0)	(0.6)	(1.5)	(1.4)	(0.1)	(1.1)	0.5	(0.1)	**(17.8)**
MKR token expenses	(1.2)	(0.3)	(1.2)	(0.8)	(1.0)	(0.8)	(1.5)	(1.4)	(0.9)	(2.4)	(1.7)	(2.3)	**(15.4)**
Total operating expenses	(3.2)	(2.7)	(5.6)	(5.2)	(4.8)	(2.1)	(5.5)	(6.4)	(2.5)	(6.3)	(4.7)	(4.9)	**(53.7)**
Net Operating Earnings	**1.0**	**(0.2)**	**1.6**	**(0.8)**	**(5.4)**	**(4.0)**	**0.2**	**2.5**	**7.4**	**12.4**	**12.7**	**9.1**	**36.8**

in millions of Dai, unless otherwise stated	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***2023***
Consolidated Balance Sheets													
Assets													
ETH	590	602	584	589	558	537	503	587	574	576	597	783	**783**
STETH	284	348	359	370	486	481	575	647	620	576	678	618	**618**
BTC	80	87	86	109	96	88	77	77	74	84	96	113	**113**
Liquidity Pool	459	453	190	190	184	184	184	181	181	176	170	160	**160**
Money Market	20	35	-	-	5	20	20	200	210	272	474	707	**707**
Other	22	25	8	4	0	0	0	0	0	0	0	0	**0**
Crypto vaults	1,456	1,550	1,228	1,263	1,329	1,310	1,358	1,692	1,659	1,685	2,014	2,380	**2,380**
PSM (Yielding)	489	478	306	408	1,000	1,000	799	745	742	360	287	140	**140**
PSM (Non-Yielding)	2,599	2,488	3,050	2,461	1,125	953	440	869	428	412	420	260	**260**
Total PSM	3,088	2,966	3,357	2,869	2,125	1,953	1,240	1,614	1,170	772	707	400	**400**
Private Credit RWA	180	195	198	213	1,217	1,225	1,640	1,694	2,194	1,989	1,871	1,585	**1,640**
Public Credit RWA	498	500	496	561	1,123	1,138	1,139	1,010	1,245	1,245	1,145	1,102	**1,139**
Total RWA vaults	678	695	694	773	2,340	2,363	2,778	2,704	3,439	3,234	3,016	2,688	**2,778**
Vault book	5,222	5,211	5,279	4,905	5,794	5,626	5,376	6,009	6,268	5,692	5,738	5,468	**5,559**
Net change in treasury tokens	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	**2.2**
Acc. mark-to-market change in value	(1.3)	(1.4)	(1.4)	(1.5)	(1.6)	(1.6)	(1.6)	(1.7)	(1.7)	(1.7)	(1.6)	(1.6)	**(1.6)**
Treasury holdings	0.9	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.7	**0.7**
Total Assets	**5,223**	**5,212**	**5,279**	**4,906**	**5,794**	**5,627**	**5,377**	**6,010**	**6,269**	**5,692**	**5,738**	**5,469**	**5,560**
Liabilities													
Interest bearing Dai (DSR)	35.8	107.8	109.5	96.6	100.7	207.6	343.6	1,317.7	1,656.6	1,547.1	1,619.3	1,465.9	**1,465.9**
Non-interest bearing Dai (Circulating)	5,109	5,027	5,094	4,735	5,622	5,344	4,965	4,635	4,559	4,092	4,057	3,947	**4,965**
Total Liabilities	**5,144**	**5,134**	**5,204**	**4,832**	**5,722**	**5,552**	**5,309**	**5,953**	**6,215**	**5,639**	**5,677**	**5,413**	**6,431**
Equity													
Surplus Buffer	77.5	76.9	74.7	73.3	71.2	74.0	66.8	56.6	53.0	52.7	61.3	55.5	**66.8**
Treasury holdings	0.9	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.7	**0.7**
Total Equity	**78.4**	**77.7**	**75.5**	**74.0**	**71.8**	**74.6**	**67.4**	**57.0**	**53.5**	**53.3**	**61.9**	**56.2**	**67.5**

in millions of Dai, unless otherwise stated	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***2023***
Statement of Changes in Protocol Capital													
Net Operating Earnings	**(1.6)**	**(1.0)**	**(3.4)**	**(2.2)**	**(3.0)**	**2.0**	**(2.5)**	**3.7**	**1.3**	**7.0**	**18.6**	**2.9**	**26.5**
Issuance for MKR token expenses	1.2	0.3	1.2	0.8	1.0	0.8	1.5	1.4	0.9	2.4	1.7	2.3	**11.7**
MKR mints/(burns)	-	-	-	-	-	-	(6.3)	(15.4)	(5.7)	(9.7)	(11.7)	(10.9)	**(20.1)**
Net Change in Surplus Buffer	**(0.5)**	**(0.7)**	**(2.2)**	**(1.4)**	**(2.0)**	**2.8**	**(7.2)**	**(10.3)**	**(3.5)**	**(0.3)**	**8.6**	**(5.8)**	**18.1**
Treasury asset income	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-	**0.1**
Treasury asset chg value	0.3	(0.0)	(0.1)	(0.1)	(0.1)	(0.0)	0.0	(0.1)	0.0	0.0	0.1	0.1	**(1.4)**
Other changes in protocol capital	0.3	(0.0)	(0.1)	(0.1)	(0.1)	(0.0)	0.0	(0.1)	0.0	0.0	0.1	0.1	**(1.2)**
Net Change in Protocol Capital	**(0.2)**	**(0.7)**	**(2.3)**	**(1.5)**	**(2.1)**	**2.8**	**(7.2)**	**(10.4)**	**(3.5)**	**(0.3)**	**8.6**	**(5.7)**	**16.9**

Source: Steakhouse Financial Accounting Dashboard for MakerDAO, Dune queries

These statements are the on-chain versions, with three additional key manual adjustments:

1) Oracle gas expenses are smoothed to actual expenses, rather than registering as single outflows
    a) This is closer to an as-incurred perspective, which regulates the accounting between 2022 and 2023, as a large 8M Dai payment in early 2022 was enough to cover the entire year of 2023.
2) Off-chain RWA vault interest income is recorded in interest income and principal balances are recorded in the balance sheet, both under a gray marking
    a) Negative revenues are a reflection of vault opening fees and setup costs, largely behind MIP65 (Monetalis Clydesdale), offset in later months as interest revenues start to accumulate
3) Modified balance of Dai outstanding to balance out the balance sheet
    a) The pro-forma view is fictitious and not a representation of on-chain reality, so we can take liberties with the record of Dai in circulation to balance the statements

This is an estimate of what the protocol would look like, had the expenses and income we adjusted taken place at the times we adjusted them on-chain.